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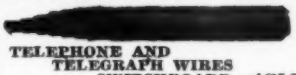

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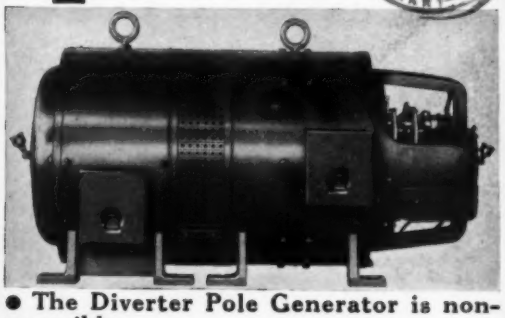

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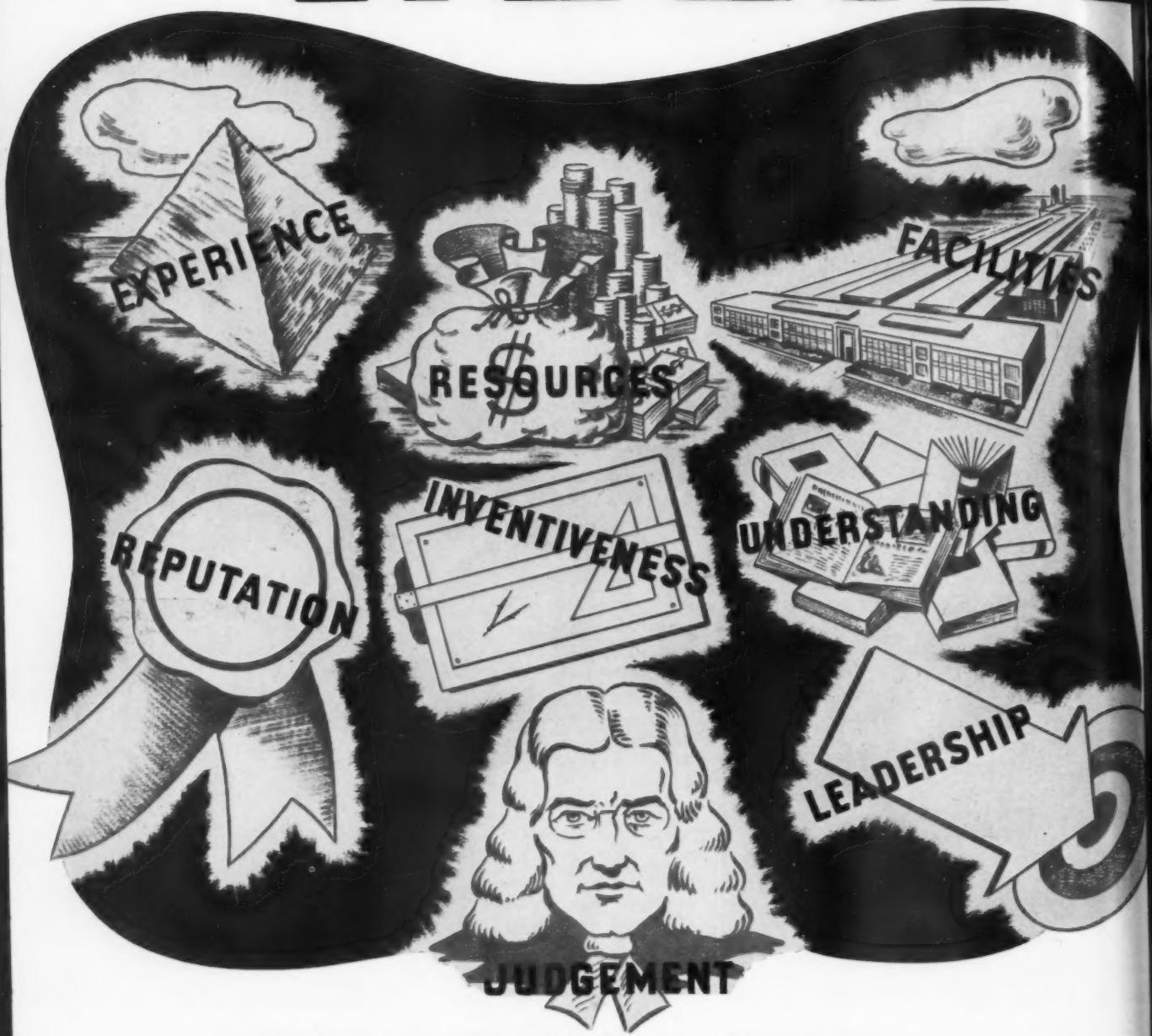

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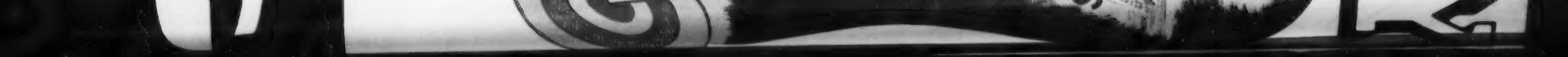

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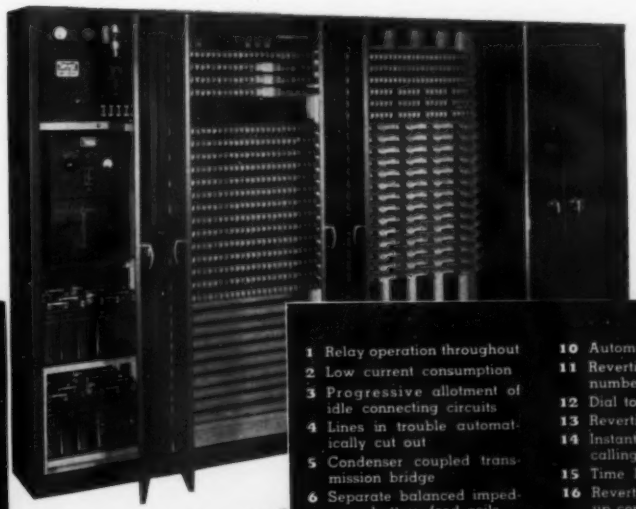

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Telephony

DECEMBER 31, 1938

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Telephony The Journal of the Telephone Industry

Volume 115 December 31, 1938 Number 27

A Year of Progress In the Industry

By STANLEY R. EDWARDS
Editor of TELEPHONY

REVIEW OF THE PAST YEAR'S EVENTS discloses a gradual gain in telephones and toll traffic . . . manufacturers' advancements in equipment . . . the new wage-hour problem . . . rural telephone improvement . . . service emergencies . . . FCC activity . . . gambling via the telephone . . . rate cases and adjustments. As a whole, the year's record was satisfactory to the industry

PROGRESS measured day-by-day is not readily discernible but when a project is surveyed over a period of time, changes and trends begin to appear. Thus, it is in reviewing events and developments of 1938 that many improvements in equipment, service, public relations, and general progress are found which were not appreciated in day-by-day work. Brief details of these various developments in the different fields of telephony are presented on other pages of this issue.

To some the year just closed was not a satisfactory period. It was not good, nor was it bad; yet when one reviews the entire field, taking the industry as a whole, it is found that reasonable progress has been made despite many obstacles.

Operating Record of the Industry

The influence of the secondary depression, which was evident in the latter part of 1937, extended into 1938. It was not until June and July, however, that the Bell System showed monthly net losses of stations. For the first five months the monthly net gains of telephones of the Bell companies were, on the whole, considerably less than the gains in the corresponding months of 1937.

In the seasonally poor months of June and July the net losses were 18,000 and 6,850 respectively. In August, a net gain of 35,200 stations was realized; and in November, for the first time during the year, the net gain exceeded the net gain in corresponding month of 1937. This reflects to some extent the recession which was already in force in November, 1937, and also the sharp improvement in business last month.

It is estimated, on the basis of 11-months' figures, that the net gain in stations of the Bell System for 1938 will be about 425,000. This compares with an increase of 875,000 Bell telephones during 1937, approximately 50 per cent of the gain of 1937. The total Bell stations in service as the year closes is estimated at 15,750,000, a record number.

Many of the Independent companies, operating in agricultural regions and in communities which have a stationary or decreasing population rather than an increasing one, do not have as large percentage increase in telephones as the Bell companies which operate in more populous sections. For the country as a whole, the Bell companies had a net gain of slightly under 3 per cent in telephones, while the Independents, collectively, averaged more than 1 per cent. Of course, some of the Bell and larger Independent companies had greater increases than these averages.

The total number of telephones in service at the close of the year approximated 19,917,000.

While many of the companies, both Independent and Bell, now have the greatest number of telephones in service in their history, the total number in the country is still about 280,000 less than peak telephone figure of 1930. Some Bell and Independent companies have not recovered their depression losses.

This operating record of the industry would seem to sustain the claim which has been made for the telephone business—that it is not affected by depressions. However, the industry was hit hard by the depression commencing in 1932 and many changed their viewpoint, that the telephone industry is immune from the bite of a business slack. The principle may, however, be restated as: Short-lived depressions do not interfere seriously with the continuing growth of telephone service.

Toll Traffic Reflects Industrial and Commercial Activity

In toll and long distance service, the industrial and commercial activity of the country is reflected. The number of these calls during the first six months of the year was about 3 per cent below the number for the first six months of 1937. However, as business activity increased during the summer and fall months, the toll and long distance traffic likewise improved, so that the year closed with only about a 2½ per cent decline in calls for the 12 months as compared with 1937.

In the following table are given the estimated number of toll and long distance calls completed by both Bell and Independent companies during each of the last nine years:

Year	Completed Calls
1930	1,078,000,000
1931	1,000,000,000
1932	850,000,000
1933	760,000,000
1934	790,000,000
1935	825,000,000
1936	925,000,000
1937	975,000,000
1938	*950,000,000

*Preliminary estimate.

Operating Expenses and Revenues

Reports by operating companies to federal and state commissions during the year show the effect on net revenues of the accumulating taxes. They show that operating expenses are increasing at a faster rate than revenues. In 1937 more than two-thirds of the increases in expenses of the Bell System were due to increased taxes and higher wage rates. In 1938 the expenses due to taxes were still increasing.

The small telephone companies, in some states, took steps to offset increased tax expense by applying for rate increases. Undoubtedly more of the companies will find it necessary to increase their rates to maintain their service. The larger companies, in addition to efforts to secure rate adjustments on exchanges where charges are out of line in some respects, made reductions in costs in various ways.

When devastating floods hit southern California early last March, crews of the Southern California Telephone Co. were in the field repairing broken lines and cables before the waters subsided. The above illustration shows Los Angeles-San Francisco inland cable where it crossed Los Angeles river in North Hollywood, with temporary cables.

Independent Manufacturers and Sales Volume

From the viewpoint of the Independent manufacturers, the year, as regards volume of sales, may be stated to have been a fair one—not particularly bad as compared with business in general nor, on the other hand, was it really good.

The volume of supply sales—that is, materials for use in outside plant such as poles, crossarms, pole line hardware, wire, etc.—was considerably less in 1938 than in 1937. There is an exception to this statement in that much supply material was required for use in several emergencies, such as occasioned by the flood in California, the sleet and snowstorms in the spring in the Middle States and the hurricane and floods in the Northeastern states in September.

The sales volume of handsets and of switchboards was proportionately good, measured in terms of general business. That telephone companies have been and are continuing to maintain a fairly heavy purchase of instruments of handset type is interesting in view of various commission orders reducing or eliminating extra charges for this equipment.

Perhaps an explanation of this demand for these new type instruments lies in the improvements that manufacturers have built into them, and also the fact that the stocks of old type instruments in storerooms of operating companies are almost depleted. There is also the matter of subscriber demand for the cradle type telephone with which the public has become familiar through the movies and the many advertisements and illustrations in newspapers and magazines.

All these influences may be having their effect on the purchases as well as the genuine desire on the part of telephone managements to give subscribers modern equipment adapted to homes and offices.

Many Problems Prove Worth of Associations

The national and state associations were faced with a number of problems during the year. A number of the state associations had problems concerned with rural electrification and, in some instances, aid was rendered through the national association in the supplying of witnesses and information in court and commission proceedings.

The Federal wage-hour law, as the year drew to a close, was given careful study by the national association. The state organizations assisted in the collection of data regarding the effect application of the law would have upon the companies in their territories. Some state associations also devoted considerable time to problems in connection with existing state wage-hour laws.

This repairman stringing a cable across a channel of high waters near North Hollywood was representative of the hundreds of employes who worked untiringly to partially restore service within five hours after serious cable washouts cut off Southern California from wire connection with outside world.

Should the Federal wage-hour law be declared applicable to telephone companies, regardless of the bulk of their business being local and intrastate, or of their status as service establishments, it is generally agreed that telephone service in many small places having locally-owned exchanges will suffer greatly.

It is stated that many small exchanges will either close or service will be greatly curtailed. On the other hand, grouping of some small exchanges into one organization or into some of the existing larger groups may likewise result. In such cases service may be supplied from nearby exchanges or unattended automatic equipment be installed. The final outcome, however, would be an increase in unemployment in these small towns, a result directly contrary to that which the wage-hour law is expected to promote.

The state associations have had many other problems more or less individual to their territories, and association officials have been alert in taking steps to protect the interests of the member companies. The increasing tendency to incorporate in state laws features of national legislation which has been adopted in the past few years, brings other problems before the associations.

The worth of national and state organizations is being proved more each year. That is the underlying reason why the membership in these organizations is now greater than it ever has been. As has been said many times, the associations render an indispensable service to their members and to the industry as a whole.

Rural Telephone Service Improvement

Considerable progress was made in the improvement of rural service. Due to rural electrification, in some instances, rural lines were metallicized. In other cases rural lines were purchased by exchange companies and plans adopted for gradually improving service.

These plans in general include limitation of the number of parties on a line to 8 or 10, conversion to common battery with either manual or dial operation, long-span open-wire construction for reduction of costs and use of buried wire where considered feasible, and improving transmission by tree clearance and removal of other hazards.

This type of plan is farther advanced in the more thickly-populated sections of the country where rates in proportion to the costs may be obtained.

Floods, Storms and Public Relations

Companies in practically all sections of the country suffered heavy property damage due to storms, floods, winds of high velocity and other weather hazards. In Southern California a sudden flood March 2 resulted from heavy torrential rains which lasted for several days. In early April, a snowstorm and sleetstorm swept over Nebraska, Illinois, Iowa, Indiana and other states, doing great damage to pole lines.

In late September a hurricane swept up the eastern coast through the New England states. It was followed by rain and flood conditions, during which more than a half-million telephones were out of service.

The praiseworthy manner in which telephone service was restored in these stricken areas and the impressions made by the employes upon the public with whom they came in contact resulted in much good will for the companies. The service interruptions caused the people in the various districts to suddenly realize how much they depend upon their telephone service; and its prompt and workmanlike restoration created a new appreciation of the organization behind their telephone service and built up much good will.

The FCC and Its Telephone Work

Outside of routine work connected with the filing of reports, rate tariffs and applications for approval of some plant extensions, the Federal Communications Commission took action on few other telephone matters. Several rulings were issued on the classification of companies as being wholly or partially under commission authority, practically completing the work started about three years ago.

One ruling, that in which the Rochester (N. Y.) Telephone Corp. was held to be fully subject to commission control, was appealed to a federal statutory court in Buffalo. This court on June 20 upheld the commission ruling that the New York Telephone Co. has direct and indirect control of the Rochester company. The financial interest of the New York Bell company in the Rochester company was the basis for the commission's ruling. The case has been appealed by the Rochester Telephone Corp. to the U. S. Supreme Court.

Rehearing of the Poteau, Okla., toll connection case was completed on March 2 before Examiner Seward. In August his report of 10,000 words recommended denial of the Oklahoma-Arkansas Telephone Co.'s petition for restoration of Southwestern Bell toll connection. Oral argument was heard on the examiner's report in early November but as yet no ruling has been made by the FCC.

The complaint in this case was filed with the FCC in 1936 asking an order of the commission directing the Southwestern Bell Tele-

phone Co. to re-establish physical connections with the Oklahoma-Arkansas company's long distance circuits at the Southwestern Bell switchboard in Fort Smith, Ark. The commission set the case for hearing in Fort Smith on October 5 and 6, 1936. Following the examiner's report and oral argument before the FCC, the commission issued its report and order remanding the case to its examining department for hearing de novo.

As previously stated, the rehearing has been held, examiner's report made and oral argument heard, but the commission has not issued its ruling.

In late July of this year the commission, on its own motion, ordered an investigation of the enlargement of the Kansas City exchange by the Southwestern Bell Telephone Co. and the circumstances connected therewith. No hearing has yet been held.

Late in 1936 the FCC cited the Southwestern Bell Telephone Co. for building intrastate toll lines in Texas without securing the commission's authorization. It was admitted that the toll lines would carry some interstate traffic. After nearly two years' consideration, the commission issued a decision on December 7 declaring that telephone companies fully subject to the commission's jurisdiction are required to obtain approval for toll line construction, even though only a small amount of interstate traffic is handled.

The commission has not as yet submitted its report to Congress on the special telephone investigation authorized by Congress in March, 1935, and hearings on which were concluded June 30, 1937. A proposed report on this investigation, prepared by Commissioner Paul A. Walker, who had charge of the inquiry, was made public last April, when Chairman Frank R. McNinch transmitted it to Congress with the statement that it was not the commission's report.

In late October the Bell company was authorized to file a brief on the Walker report and this was made public December 12. The brief claimed that because of its errors, mis-statements of facts, and conclusions not based on facts, the Walker report could not properly be endorsed by the FCC as its report to Congress.

Because of its radio investigation, radio and telegraph cases, and internal difficulties which may result in a Congressional investigation, there is uncertainty as to when the commission's official report on the telephone investigation will be submitted to Congress. The commission is reported to be working on a report with the thought of early completion. Doubt, however, is expressed in many quarters that the commission will come to full agreement on the report.

Gambling and Telephone Service

The use of telephone service in gambling operations, particularly in transmitting horse-racing information, was much to the fore in several sections of the country.

It came up in Chicago in connection with the state's attorney's drive on handbooks. A petition was filed with the Illinois Commerce Commission asking that the Illinois Bell Telephone Co. be ordered to refuse service to gambling establishments. A hearing was held but no evidence was presented.

It was pointed out that the telephone company cooperates with the police and the state's attorney's office in refusing service where it is known to be used for gambling purposes.

The matter of telephone service and gambling was also up in Louisville, Ky., and St. Louis, Mo.

In Pennsylvania the use of leased wires in gambling operations was given prominence in October in connection with the political battle preceding the elections. The commission on October 26 ordered the Pennsylvania Bell company, the Keystone Telephone Co. and the Pennsylvania Telephone Corp. to stop service to any place which has telephone connection with race tracks or nationwide News Service, Inc.

A special session of the Pennsylvania legislature last month passed a law imposing drastic obligations upon telephone companies in connection with gambling. This law was reported to have been drawn up by the U. S. Department of Justice in Washington, and it was also backed by Commissioner Walker of the Federal Communications Commission. It is possible that such a law may be presented to Congress for federal enactment and also suggested for adoption by state legislatures during the coming sessions.

Companies and Labor Relations

Two cases involving telephone companies were brought before the National Labor Relations Board on claims of violation of the Wagner Act. Both were in Wisconsin.

Charges of unfair labor practices were made against the Commonwealth Telephone Co., Madison, by an affiliated electrical union of the AFL. The company denied it was engaged in interstate commerce and hence not subject to the Labor Relations Board. It was shown, however, that the company handles long distance interstate calls and the charges were upheld in an intermediate report issued by the trial examiner for the NLRB.

Charges were also brought against the Wisconsin Telephone Co. by an AFL operators' union. The company was charged with unfair labor practices, refusal to bargain collectively and with fostering a company union. A number of hearings were held and the examiner of the NLRB ruled against the company. Exceptions to the examiner's report were filed by the company with the board in Washington.

Property Transfers and Sales

Sales and transfers of properties took place in several of the states, especially in the Middle West. In some instances there were sales of exchanges, acquired by group companies during the wave of speculation about ten years ago, to small individually-owned companies or to group companies which can operate them more efficiently. In other cases rural farm lines were purchased by the Bell companies with the purpose in view of placing them upon an efficient telephone service basis.

An example of the first mentioned classification is that of the exchange at Frazee, Minn., being sold by the Central West Co. to the Lake Region Telephone Co. The Mid-West States Telephone Co., which sold exchanges in Minnesota and Iowa to the Central Iowa Telephone Co., is also an example of this classification. The purchase of rural lines in Crow Wing county, Minn., from the Gull Lake Telephone Co. by the Northwestern Bell Telephone Co. is an instance of the other class mentioned.

Bell companies have taken under their own name some properties in which control has been held for years. The most notable instance of this kind was the transfer of all the Kansas properties of the United Telephone Co. to the Southwestern Bell company, a total of 55 exchanges in northern and western Kansas.

There have been several instances of Bell and Independent companies trading properties where certain exchanges would fit into the other's system for more efficient operation. Cases of this kind are noted in Oklahoma and Texas.

These various sales and transfers, in the main, will make for better tele-

(*Please turn to page* 23)

The Independent Manufacturers' Part
In 1938 Progress

CONTRIBUTING MORE THAN THEIR SHARE of developments and new products during the year, the Independent manufacturers again anticipate public demand by supplying subscriber and central office equipment with eye appeal as well as efficient operating qualities. Principal technical developments of various manufacturers are briefly described

IN DEVELOPMENTS and new products during 1938, Independent telephone manufacturers more than contributed their quota in anticipating desires of customers of operating telephone companies. Companies were advised of the availability of equipment pleasing to the eye and with efficient operating characteristics. The attractive telephone instruments supplied by manufacturers to operating companies, placed the latter in a position to compete strongly with merchants of other products for the consumers' dollars.

The research laboratories of the Independent manufacturing companies in some cases were expanded during the year to take care of increased activities. The results of the work of these laboratories is gradually reflected in the products and improvements of their respective companies.

A small automatic equipment for common battery full dial service was brought out. This equipment is intended for installation in connection with the development of new territory, the improvement of service in communities now served on a party-line basis and the establishment of a high grade of service in waning communities. It can be mounted on a pole.

Cable terminals showed improvement, one type of wall frame being developed with a moisture-proof cable chamber on one side and a standard protector group on the other. This permits terminating lead-covered paper cable inside the exchange. An underground reversible cable terminal, compact and lightweight, was a new development. Installation simplicity and insulation quality are two of the outstanding features of this new terminal.

In publicity throughout the year, emphasis was placed on the development of more communication in buildings and homes through means of PBXs or their equivalent for intercommunication. The trend in design toward the subscriber's convenience and comfort and ease of handling, continued in the manufacture of handsets, and parts interchangeable with various models of subscribers' sets were brought out. Handsets made especially for magneto telephone instruments were available.

In telephone booths changes are noted in the framework material, shape and design for privacy, quietness, cleanliness and safety. Sound-conditioning of booths is an important feature.

In the matter of dry cells, extra service characteristics, long service life, improved voltage characteristics and increased uniformity were announced.

Sales of telephone repeaters indicate that the telephone companies favor ownership rather than rental of this class of equipment.

Technical Developments of Automatic Electric

Among the principal technical developments of the Automatic Electric Company is voice frequency dialing over toll lines. This permits one operator to connect with any station in a remote automatic exchange without the assistance of a second operator, and to dial over toll lines having voice repeaters. This is used on the trunks between the automatic exchanges at Sao Paulo and Rio de Janeiro, Brazil.

A new bakelite self-contained handset telephone styled on modern lines is another development of the Automatic Electric Company. In it is employed a new transmitter, new receiver and an improved transmission circuit. The set combines higher transmission characteristics with better balance; provides more effective ringing and more pleasing ringing tone and includes new facilities for lifting and carrying the instrument.

For use on private automatic systems, a new combination loudspeaking telephone and key-type instantaneous station selector was announced by this company. Another technical development is an improved type of battery-searching selector for Strowger automatic systems. It provides increased trunk hunting speeds and other improved characteristics.

New subscriber's line equipment for automatic boards is another technical development of the company. This consists of two relays per line instead of the customary three. This equipment is employed where reverting calls are made by directory number.

Reduced station gains in the early part of the year, the Automatic Electric Company states, resulted in some curtailment of purchases by the operating companies. While this trend continued during the year, it has appeared less severe during the last few months; and this has resulted in recently-improved business with an encouraging outlook for 1939.

There was increased interest among operating companies, according to the Automatic Electric, in the adoption of unattended automatic boards for small exchanges. Likewise, there has been progressively greater attention given installation of remote control (automatic) toll boards. Several installations were completed or placed on order during the year, including a 14-position board for Honolulu.

Among its larger automatic installations of unusual interest to the company was that at Richmond, Ind., where the new equipment replaced a Strowger board that had been in service more than 30 years.

Kellogg Switchboards and Telephones

Actual operations in the large new plant of the Kellogg Switchboard & Supply Co. in Chicago commenced early this year. In it have continued the development and manufacture so well carried on in previous plants of

the Kellogg company during the past 42 years.

Some of the developments introduced at the end of 1937 did not actually get under way until early this year. These include the Masterbuilt switchboards of junior and magneto types and Masterbuilt floor type PBX switchboard and the relaymatic switchboard.

The Masterbuilt junior switchboard, designed primarily for small individually-owned exchanges and for certain exchanges operated by group companies, is a small, economical common battery board of the non-multiple type. It is a simple matter to stand two or three units side by side in event of emergency or during seasonable periods of the year when traffic increases many times over its normal rate.

The Masterbuilt magneto switchboard is a new development containing late engineering features designed for efficient operation. It has a steel frame foundation and a cabinet having simplified lines. All weight of the equipment is supported on the framework and the cabinet, attached to the framework, is merely a trim. This construction is in great contrast to the old type magneto switchboards.

The Masterbuilt floor type PBX switchboards were also developed to please the eye as well as to render efficient service. The steel frame construction is the basis of the switchboard, while the cabinet adds to appearance.

The Kellogg relaymatic switchboard is an all-relay automatic unit available in various capacities for use in both central office and unattended PBX service. It was developed to meet some new conditions. It is designed for use in such places where automatic switching can be used advantageously. This equipment is another use of reliable relays that have been used in Kellogg manual equipment for more than 40 years.

A new development for increasing the life of Kellogg switchboard telephones and cords by 25 to 35 per cent was introduced in the company's new plant.

A multiple key turret was brought out this past year as a special service item for telephone companies. It is particularly useful in establishments where there is an order department or where a number of operators are answering the same type of calls. Each operator uses a turret, and each turret can be equipped with any number of trunks up to ten. The trunks are multipled on all turrets used.

COMING CONVENTIONS

Minnesota Telephone Association, Hotel St. Paul, St. Paul, January 24, 25 and 26.

Texas Telephone Association, Baker Hotel, Dallas, March 22, 23 and 24.

Oklahoma Telephone Association, Huckins Hotel, Oklahoma City, March 27 and 28.

Kansas Telephone Association, Municipal Auditorium, Junction City, March 30 and 31.

Nebraska Telephone Association, Lincoln Hotel, Lincoln, April 11 and 12.

Missouri Telephone Association, Hotel Muehlebach, Kansas City, April 3 and 4.

Iowa Independent Telephone Association, Fort Des Moines Hotel, Des Moines, April 18, 19 and 20.

Ohio Independent Telephone Association, Deshler-Wallick Hotel, Columbus, April 25, 26 and 27.

Indiana Telephone Association, Claypool Hotel, Indianapolis, May 10 and 11.

New York State Telephone Association, Hotel Syracuse, Syracuse, May 23, 24, 25 and 26.

The Illinois Telephone Association, Pere-Marquette Hotel, Peoria, June 7 and 8.

Incoming calls are indicated on all of the turrets in front of each operator by a lighted lamp which is extinguished by the order clerk who answers the call first. When used in connection with a PBX the PBX operator's work is lightened because she merely plugs the call into a line leading to the key turrets and the clerks are able to sort out such calls.

These units are so arranged that any order clerk can transfer a call to another without inviting the attention from the PBX operator or the main exchange operator. The equipment is of the type which speeds service to customers of the telephone company's subscribers.

Several new telephones were introduced by Kellogg during the year. Among them is a small conventional wall set for either common battery manual or dial operation. Of the conventional type but of smaller size, it is contained in a steel housing. This unit offers better transmission, reception and ringing and was designed to solve common battery rural line service problems.

It employs the same transmitter, ringer, resonance chamber, induction coil, condenser, connecting rack and back mounting plate as the new small bakelite desk set boxes, which were introduced along with the modern streamlined Masterphones. Most of these parts are also interchangeable with those of the Masterphone line.

A new desk stand with the Kellogg non-positional transmitter was also introduced for magneto, common battery manual or dial service. This instrument is arranged to connect with any triad (anti-sidetone) circuit desk set box. It also employs the company's new one-piece bakelite transmitter front and mouthpiece which takes the same non-positional transmitter as used in Masterphones.

This bakelite unit is also made to fit all standard Kellogg desk stands and wall sets.

A new magneto desk Masterphone was made available during the year. It can be converted simply and economically to a dial type instrument.

Introduced this past year by Kellogg was a modern keybox, pleasing in design. It has a bakelite housing fashioned along the lines of the company's wall Masterphone. This keybox is available in two types: one for switching a telephone to either of two incoming lines, the other to switch a telephone to any of three incoming lines. Keyboxes of necessity must be in plain sight, hence compactness, and modern styling are important features.

Leich's New Products for 1938

The broadening activities of the Leich Sales Corp. in 1938 included the issuance of a 128-page catalog early in the year containing a complete listing of new and accepted telephone construction materials and supplies. This was followed by the presentation of a number of new products from the research laboratories of Leich Electric Co. These new developments include:

A new all-molded combination magneto handset — a combination wall and desk set. The set is so arranged that it can be used as a desk handset, with the molded generator box mounted separately; or, when desired, the two units can be combined to form a small, self-contained wall-mounting handset.

The principal component that has made the compact design of the instrument possible is a new-type generator. This generator is somewhat less than one-half the size of the old style five-bar type but is very powerful due to use of highly magnetic material in its magnets.

Another important Leich development for 1938 was the introduction of an all-purpose repeating coil designed to fit new small-size repeating coil housings. The new coil is a talk-through, ring-through unit with a one to one impedance ratio. It has an extremely low resistance and windings that are nearly perfectly balanced.

With increasing use of repeating coils to avoid circuit metallicization in some sections of lines, and to reduce inductive interference in those areas where rural electrification is progressing, the development of this coil and the new coil housings is of timely interest.

In 1938 Leich made several additions to, and important changes in, its line of switchboards. The new switching units include a compact cordless PBX and a new small lamp signal switchboard featuring line-at-a-time conversion from magneto to common battery service.

Structural improvements in the entire line of Leich switchboards include the streamlining of the cabinets, the greater use of molded materials on those exposed portions subject to wear, and the use of color in the finishing of cabinets to harmonize with the central office surroundings.

The year also saw a widespread increase in the use of this company's battery feed coils. These are used with magneto switchboards to furnish common battery service to those individuals who are impatient with "cranking" their telephones. Some telephone companies are replacing old magneto telephones with new common battery handsets, through use of these coils, and are obtaining increased revenue from them.

Stromberg-Carlson 1938 Telephone Developments

During the year just concluded the Stromberg-Carlson Telephone Mfg. Co. expanded its 2-6 telephone system, brought out non-multiple switchboards with super-service features, and rearranged its power terminal unit for greater convenience and economy of space.

In the first of these advances ten stations are provided, instead of six, with their control buttons and the central and holding buttons in a small, phenol compound apron along the front of the new telephone. This telephone is a self-contained instrument which does away with bell boxes in an intercom-central system and can be converted to dial use when necessary.

The 2-10 telephone system is operated in this way: To receive a call the central button is pushed and the call taken on the handset. If it is for some other station, the hold button is pushed and then the button at the answering telephone is pushed to signal the station desired. The system may be modified, when desired, to give three trunks to the central office and nine stations.

The adaptation of Stromberg-Carlson's super-service universal cord circuit to non-multiple switchboards gives these switchboards some 18 useful and economical features relating to listening, ringing and supervisory lamp operations.

In the revision of its power terminal unit the Stromberg-Carlson company has placed its wire chief's test set in the middle of the rack, between the power board and the arresters, which have been moved from behind the rack to its front, bringing them immediately adjacent to the test set. The wire chief's test set has been equipped with a handset which eliminates the old transmitter and the operator's headset.

The power circuit is so arranged that the calculagraph which ordinarily operates from alternating current supply will draw its power from the battery-driven vibrator in case of power interruption in the alternating current line. This is accomplished by means of a relay in the power line circuit which operates without manual attention the instant the alternating current is interrupted.

Early in the year this manufacturer went into production of two new handset telephone instruments—one a desk type and the other an attractive wall type. The desk type is a self-contained unit with its lines suggesting great strength and serviceability, yet the instrument is surprisingly light in weight. The ringer of this set has two gongs of different weights of metal to produce a two-tone effect. The wall type set supports its handset in a vertical position which permits its lines to blend with the graceful curves of the phenol compound case.

The mechanical features of these telephones—induction coil, condenser, and ringer—are identical. In the desk type they are mounted on an oval base while in the wall type they are mounted on a rectangular base, having two bayonet slots to permit great ease and quickness in installation.

These two instruments have won popularity in the field and largely because of them the manufacturer enjoyed an excellent business year.

Flashes and Plugs—News Briefs and Comments

When the Milton Avenue Evangelical and Reformed Church in Louisville, Ky., recently celebrated its 30th anniversary, three former pastors in distant cities participated by long distance telephone hook-ups.

On the first Sunday one of them gave a ten-minute memorial greeting from his home in Dayton, Ohio. On the following Sunday another spoke from his pulpit in Indianapolis, Ind., so two congregations shared the service. And on the third Sunday the remaining former pastor at his home in Portland, Ore., 2,500 miles away, telephoned his greeting.

* *

At the last election two women in Williamson, W. Va., voted by telephone. They were invalids unable to leave their homes, and the election officials suspended the legal regulations. One voted Democratic and one Republican.

* *

In Cleveland, Ohio, 250-pound Henry Walkersdorfer suffered a heart attack while in a telephone booth and fainted. Police ambulance men had to tear down the booth door to extricate him. He recovered.

* *

Latest statistics show there are more than 2,800,000 telephones on the farms of the United States, representing 44 per cent coverage. Increasing farm prosperity should double this quota.

* *

An Ohio farmer wanted telephone service so much that he dug 26 holes and set the same number of poles to hasten the installation of the line to his house.

* *

Telephones played an important part in big football games during the fall. Scouts equipped with field glasses occupied seats high in the stands and telephoned tips to the coaches on the field benches.

* *

Washington commentators say the government is the A. T. & T.'s biggest customer. There are 1,300 telephones in the capital's federal offices and long distance calls—both national and international—are frequent.

Bell Technical Developments During 1938

WITH A VIEW TO BETTER long distance and local service, the Bell System companies expanded existing plant and installed new apparatus, equipment and methods. Details are given of many technical developments and of improvements and emergencies

INSTALLATION of new apparatus, equipment and methods with improvement and expansion of existing plant looking towards better and more efficient long distance and local service marked the year 1938 with Bell System companies as a result of technical developments.

Carrier Systems

New cable carrier systems (type K), which provide 12 complete talking circuits on one four-wire 19-gauge cable circuit, are now in operation between Detroit, Mich., and South Bend, Ind., and between New York and Charlotte, N. C., a total of 17 systems at the end of the year. This development was described in several papers presented before the A. I. E. E. Midwinter meeting last January.

New 12-channel open-wire carrier type J systems have been or are being placed in service between Dallas and San Antonio, Dallas and Houston, Texas; Charlotte, N. C., and West Palm Beach, Fla., and Oklahoma City and Whitewater, Cal. This system is placed above the three-channel type C system and the voice circuit, thus yielding a total of 16 telephone conversations on a single open-wire pair.

The extension of the frequency range from the previous upper frequency of about 30,000 cycles for the type C system to about 140,000 cycles for the type J system has necessitated the development of new types of transposition designs and line rearrangements.

Additional repeaters are required between existing type C repeater stations, these being designed to function for considerable periods of time without attendance.

A new three-channel, open-wire system, known as the C-5, which is simpler in design, superior in performance, much more compact and less expensive than the previous type C system, is now being manufactured and applied.

The type H single-channel open-wire system, the development of which was completed in 1937, was applied in large numbers during the year. In addition to applications in the Bell System, more than 30 such systems were used outside the Bell System on telephone company, railroad and oil company lines. A repeater is available which makes it possible to span a distance of 500 miles with this system.

New Cable Design for Carrier Use

An alternative to the use of two toll cables for carrier on cable is a new two-compartment type of cable, the first installation of which was made in 1938 between Portland and Wyeth, Ore. While the cable carrier system has not been applied to this cable, the new type cable has been used in anticipation of the early application of cable carrier over this route.

It is interesting to note, as an indication of the flexibility with which these new carrier systems can be fitted into the plant, that the older types of open-wire carrier systems previously employed over this route and over open wires beyond Wyeth are being retained, and carried through the new cable by using certain elements of the cable carrier system in modified form.

Coaxial Cable Tests

The original trials of the experimental coaxial cable between New York to Philadelphia covered tests at frequencies up to one million cycles. During the past year additional trials were conducted in the section between New York and Princeton, N. J., at two million cycles. This has, of course, required modifications of both the repeaters and the terminal equipment.

In one test a circuit 2,100 miles long was obtained by looping back and forth through channels located in different parts of the frequency band between 100 and 1,900 kilocycles. In the tests the voice currents in each direction were translated from one frequency to another, a total of 64 times, and in each direction passed through an equivalent of 420 amplifiers.

Toll Cable Added to Bell Systems

During 1938 about 700 miles of toll cable were added to the Bell System, bringing the total sheath mileage of such cable in the United States up to about 30,000 miles. These additions include a second cable between Greensboro and Charlotte, N. C., a distance of about 90 miles.

This completes a two-cable installation over the entire route between New York and Charlotte and has made possible the application of the cable carrier system (type K) previously referred to. In this system telephone conversations are carried one way over one cable and in the reverse direction over the other.

Repair of Aerial Telephone Cable

An improved technique has been put into use to repair failures in the sheath of aerial telephone cable.

In this alternative method the sheath is slit by means of special tools without removing it and is flared out so that the core of the cable can be lifted out and dried in a portable oven. The sheath is then fitted back to the cable, closed and sealed with solder applied by means of a carbon electrode soldering device.

Drying Cable Splices

The method of drying cable splices by desiccants, which has been under experimental trial for some time, has recently been placed on general field trial with Bell companies. The desiccant employed is calcium sulphate.

In drying the splice about half of the material used is trickled into the spaces among the conductors made by spreading them apart, and the rest is placed in the ends of a cradle of muslin near the sheath butts.

The total quantity employed is sufficient to take up completely all the

moisture present, even if the insulation contains the extreme amount that the paper and paraffined sleeves can absorb when exposed during a three-day splicing period in a highly humid manhole.

This desiccant is packaged in cans with screw-tops. It seals in three convenient sizes, which makes for economical use inasmuch as any material left in the can at the end of the day is thrown away.

Spacing of Telephone Wires

The close spacing between wires on telephone poles is limited by possible contacts when swung by the wind. Previous practice has called for a separation of 12 inches, but field tests, which have been made over a period of several years, show that eight or even six inches is enough in many situations.

This closer spacing reduces the noise induced from external sources, such as radio, static and crosstalk between circuits. These improvements make possible the use of higher carrier frequencies, providing additional telephone channels.

One full-scale test has been under way for eight years, during which time the instantaneous wind velocities reached 60 miles per hour on several occasions each year and exceeded 70 miles per hour at least once. These tests have shown the relationship between instantaneous wind velocity and the fundamental factors of wire sag, spacing and span length.

In this and other tests various spacings were employed and experiments were made with devices, such as insulating disks and spacers, which would prevent the closely-spaced wires from contacting in the span.

These studies by the Bell Laboratories have confirmed the practicability of reducing the spacing from 12 to 8 or to 6 inches under suitable conditions. Six-inch spacing, for example, is employed in connection with the new Dallas-Houston and Dallas-San Antonio carrier systems previously mentioned. This work has played an important part in broadening the field of use of carrier telephone systems on open-wire lines.

Improved Line Tie Wires

During the year a type of tie wire, rolled flat and with curved edges, was widely applied as a means of overcoming the abrasion of line wire caused by round tie wires. The use of this wire, in which the flat side is presented to the surface of the line wire, substantially eliminates such abrasion.

Loading Coils

During 1938 further progress was made in utilizing the improved small-sized coils employing molybdenum-permalloy core material. These coils can now be employed on long exchange cable circuits to a greater extent than the previous types.

Because of their small size it is possible to use the lead-sleeve type of case for potting as many as 50 coils in one complement, 15 having been the previous maximum. The small size of the new coils also makes them particularly suitable for inclusion directly in the cable splices when only a few pairs are loaded.

Improvements in Wire

During 1938 there has been applied commercially to several types of wire used in the exchange plant a recent development which provides a much greater degree of adhesion of the rubber compound than has heretofore been possible.

For the thin tin coating previously employed on the wire, a coating of lead followed by brass flashing, deposited electrolytically, is substituted. This new coating not only provides better adhesion but also safeguards against corrosion of the conductor.

Short-Circuiting Relay Protectors

The carbon block protectors employed on telephone lines ground the conductors with extreme rapidity whenever excessive voltages appear and provide very effective protection. However, if they are called upon to carry heavy current for more than a very short time, they may permanently ground the line conductors.

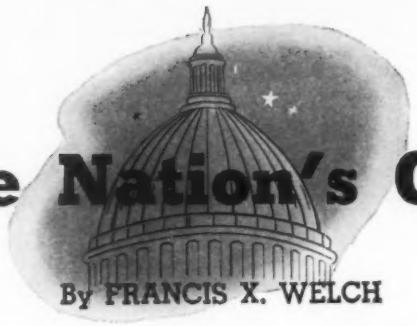
Such permanent grounds are more likely to occur from surges due to induction from power lines than from the very brief surges of lightning. Where such permanent grounding occurs, a service interruption will result, which is, of course, much more serious where protectors are installed remote from a central office.

To minimize such difficulties on open-wire lines, relays have been designed which operate promptly to short-circuit the protector for the duration of the disturbance. One form of this arrangement is known as the multi-grounding relay protector, which is intended for installation on lines where excessive voltages to ground from induction may occur frequently. Another form for the same purpose is the unit type relay protector and is applicable where only a few circuits are to be protected.

With either of these arrangements

(*Please turn to page* 24)

Those scenes in Milton, Mass., show joint telephone and power leads snapped off by the September hurricane which caused millions of dollars' property damage. Uprooted trees wrecked much aerial cable and open-wire plant throughout the entire storm area.



In the Nation's Capital

By FRANCIS X. WELCH

Special Washington, D. C., Correspondent for TELEPHONY

WASHINGTON ACTIVITIES take breathing spell over holiday season. . . . Some year-end actions in Washington of interest to telephone field. . . . Investigation of the radio industry explained in form of a "Snow White" allegory

OFFICIAL Washington knocked off a few days before Christmas to celebrate the holiday season, which served as a much-needed breathing spell in the recent hectic pace of affairs. The FCC finished up its work on December 23 after deciding the Seattle radiotelephone case and receiving the supplemental Bell brief replying to the Walker report. It was not scheduled to resume work until January 3.

The President held his last Cabinet session of the year December 21, at which Attorney General Cummings and Secretary of Commerce Roper made their farewell appearance as members.

The House of Representatives appropriation subcommittee (about the only official unit of Congress other than the TVA and monopoly investigating committees, which have been operating in Washington prior to the session's opening) quit hearings for the holidays without taking action on the FCC appropriation—a significant development which we shall consider presently.

The TVA joint congressional investigating committee cleaned up its work and took an indefinite postponement on December 21, subject to possible recall by its chairman, Senator Donahey, when and if Congress gives the committee more money to go ahead. Senator O'Mahoney, chairman of the monopoly investigating committee, quit early, December 16.

One of the last conferences held by the Wage-Hour Administration officials was on December 20, with officials of the United States Independent Telephone Association attempting to straighten out differences over jurisdiction and enforcement of the Fair Labor Standards Act with respect to local independent telephone companies.

The U. S. Supreme Court recessed for the balance of the year on December 19 after agreeing on that day to hear arguments in two cases of interest to the telephone industry. One is the appeal of the Pennsylvania Public Utility Commission of the so-called "York case" which involves the validity of temporary rate procedure which is so fashionable nowadays among the up-to-date state commissions.

Justice Black thought this case should be heard sooner than the assigned date, February 6, so as to give present Democratic state counsel a chance to argue it before they are thrown out of office by the new Republican regime which will be inaugurated at Harrisburg on January 16.

The second case is the appeal of the Rochester (N. Y.) Telephone Corp. from a lower Federal court decision upholding FCC jurisdiction over an Independent company whose corporate policy was found to be subject to Bell control, even though Bell lacked actual majority control of the voting stock. No date was set for this, so it is not likely to come up for argument through the regular calendar call for at least a couple of months.

THE ACTION of the FCC in denying to the city of Seattle authority to construct a municipally-owned competitive radiotelephone station to serve the surrounding coastal harbor points and adjacent Canadian waters, was based upon six points: (1) receptive interference; (2) defective procedure; (3) no proof of efficient city service; (4) no proof of inadequate existing service; (5) no proof of public demand despite a slight rate cut; (6) no general finding of public convenience and necessity.

Of noteworthy significance was the sole dissenting opinion by Commissioner Walker, who would give the city of Seattle the right to go into the radiotelephone business in competition with private service, now operating, provided the city asks for a different frequency which would not interfere with existing radio facilities.

He pointed out that shipping is the chief business of the city of Seattle and observed that the federal government has recently shown a marked preference for public operations in other fields. He concluded that a little competition in the radiotelephone business might be a good thing within the spirit of the Communications Act, and in the public interest.

The action of the House subcommittee on appropriations continuing to delay hearings on FCC appropriations for the fiscal year of 1939-40 gave rise to conflicting rumors, as the nation's capital turned to Christmas trees, well-wishing and eggnog. One heard that the delay was because a number of Congressmen wanted a chance to be present to give the FCC representative (probably Chairman McNinch) a good stiff

"going over" on recent developments. If so, it wouldn't be the first time the FCC spokesman before the committee ran such a gauntlet.

More surprising was the rumor that it was the administration itself which was responsible for holding back on the appropriation of FCC funds until it is determined whether or not there will be any attempt by the administration to reorganize the basic FCC set-up through amendatory legislation. In any event, the FCC is seeking to boost its appropriation next year from $1,700,000 to $2,300,000, which might be another reason for some delay.

Whatever may be the cause, it is certain that unless the FCC appropriations are approved by the subcommittee and a bill completed for action early in the session, the commission's financial allowance is likely to get ensnarled with anticipated resolutions to investigate the FCC or possible bills to reorganize. And that could happen whether the administration planned it that way or not.

A READER of this department wrote in some time ago and suggested that your correspondent explain what this continuous quarreling and threatened investigation of the radio industry is all about. This reader wanted to know just how the agitation started; whether Congress will investigate and why, and what is likely to come of it all.

This being the holiday season, when such heavy businesslike topics ought to be taboo, perhaps it would be more appropriate if your correspondent tried to answer this request in the form of an allegory—a fairy tale, which might be entitled, "Snow White and the Big Apple!" Here goes:

Once upon a time there ruled in the Land of Communications the Queen of the Fourth Estate (otherwise known as the Press). She was quite a beautiful lady—and how well she knew it! It seems she had a magic mirror which accurately reflected all of her attractive features in terms of commercial advertising. Every morning she would rap on the glass and say, "How'm I doin'?"

Always a mysterious man-in-the-mirror would say:

"You're still the tops, Queenie. You've got everything: mass appeal, class appeal, and—well, your drawing power is terrific. Your circulation gets better every day," etc., etc., etc.

This always put the Queen in a good mood for her routine day of tyranny. She was a pretty bossy lady. She told business men how to run their business, labor how to labor, and rulers how to rule. She gave advice on cooking, music, art, drawing, sports, and romance. She had all the politicians jumping through hoops like scared puppy dogs.

But one day, when the Queen rapped on the mirror and told the advertising man inside to go into his act and report progress, he hemmed and hawed, and finally told her straight out:

"Sorry, Queenie, but we—that is to say, the Board—feel that we must make some other commitments to cover the field properly. The name of the party is Snow White, in case you're interested."

(Now Snow White was a very young Princess in the Land of Communications and was also known as Radio, or the Princess of the Air Waves.)

"Snow White!" screamed the Queen in tears, her breath coming in short takes, "why, what has she got that I haven't?"

"It is not my function," the mirror man said, "to comment on the comparative merits of competitive media. I only know that we—that is, the Board—must be governed by our budgeting commitments." And with that he faded out, leaving the Queen's teeth chattering with rage, like a battery of linotype machines.

"What a blind fool I've been," she gasped. "Snow White is the little hussy I allowed to hang around my amusement section. Why, it seems only yesterday she was just a dowdy frump in headphones. And to think I've been practically keeping her with free program notices! Well, by golly, I'll fix her clock, if it's the last slug in the box."

The Queen pondered for a while whether to enslave the little princess by gaining complete economic control over her. She finally decided, however, to kick Snow White out into the cruel world on her own. The Queen figured that if the Princess were knocked around enough, she wouldn't look so hot after a while—to the advertisers, at least. And indeed when the great storms of the depression came, Snow White was nearly liquidated several times, as radio stocks skidded up and down on the exchange like wild things.

But Snow White somehow managed to survive until the dawn of the New Deal came along. Then somebody told her that she could find refuge and become truly stabilized, if she would consent to enter and stay under cover of regulation, in a house that was occupied by Seven Dwarfs.

IT WAS a mighty queer mousetrap where the Seven Dwarfs lived—all torn up in wild disorder, as if the little men spent most of their time fighting one battle royal after the other. Snow White thought that the Seven Dwarfs personally were a bit whacky at that, but well meaning for all their quarreling. And they became very fond of her in time.

There was the leader, Doc, who was not quite sure of himself because he had only recently become boss; and, of course, Grumpy who was always dissenting from the rest of the Dwarfs. Then, there was the unpredictable Dopey, a well-qualified Dwarf given to sliding up and down the banisters to keep folks guessing.

Bashful was a conservative Dwarf who didn't have much to say and kept his hat on even when he was walking around under the rugs (which he did to avoid attention). Sleepy didn't have much to say either, having a hard job keeping his eyes open. Happy tried to get the Dwarfs to agree, which was a hard enough job. Sneezy had a habit of startling folks with his periodical blasts against "vested interests" and "monopoly."

By and large, however, Snow White was getting along first rate with the Dwarfs (even Grumpy, who originally objected to her because he said she went around scaring little children). But unfortunately the Queen, through her advertising mirror, found out soon enough that the little Princess of the Air Waves was still her competitor and was flourishing under the supervision of the Seven Dwarfs.

Needless to say, this made the Queen sore as a boil. So she hastened to her chamber of horrors and mixed up her worst recipe for poison. The recipe (in case you've got similar troubles of your own) was as follows:

Two parts Propaganda, one part Editorial, a dash of Mae West perfume, a page torn out of a Pulitzer Prize play (spiced with cuss words), the shirt tail of a Man from Mars, a pinch or two of political scandal, and the hides of several fat lobbyists—all stirred slowly in a congressional stewpot until it came to a boil.

The result was a Big Apple and a lot of gas which shriveled up the Queen until even her worst friends wouldn't tell her. She grabbed the Big Apple and hobbled off towards the Dwarfs' home.

She found Snow White happily en-

(*Please turn to page* 33)

BUSINESS USERS EV
P-A-B-X

WHERE ARE SAYING—

"P-A-B-X Service is just what we need!"

"Our business has outgrown the horse and buggy stage. We should have modern automatic interior communication—instant service for everyone in the organization, day or night.

"With our interior calls handled automatically, our operator can give her full attention to important outside calls, and will have time to give courteous attention to our regular telephone customers, as well as to new prospects who call in.

"Our organization needs modern P-A-B-X service, and I suggest that we sign up for it at once!"

This is typical of the attitude expressed by most business men, when the many advantages of modern Automatic Electric P-A-B-X service are explained to them. Telephone companies in every part of the country are finding that educational campaigns, which instruct present and prospective private exchange users in the features of modern P-A-B-X service, result in increased demand for this service and proportionate increases in private exchange revenue.

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Fathers and Sons in the Inden

WELLINGTON S. CLAY, general manager of the Hutchinson (Minn.) Telephone Co. since its organization more than 40 years ago, has as his assistant manager his son, **WARREN B.,** who has been working for the Hutchinson company full time since 1931.

W. S. CLAY was born in Oronoco, Minn., January 19, 1870. After securing a common country school education, he served as a farm hand, a trapper, hunter and woodsman. Immediately prior to engaging in the telephone business he was engaged in the newspaper business. After learning the printer's trade, he published a country newspaper for six years.

When a newly-built long distance telephone line was terminated at his office through lack of poles and materials to build farther, Mr. Clay in 1898 entered the telephone business by organizing the Hutchinson Telephone Co. He established telephone service in that community and has served as manager of the company ever since. He has rebuilt the exchange several times and has constructed hundreds of miles of rural lines. He now operates more than 1,400 telephones, nearly 1,000 of them common battery.

Mr. Clay assisted in the organization of the Minnesota Independent Telephone Association. He officiated as secretary for the first two years, later as vice-president, and was a member of the board of directors for many years. He also aided in organizing two other state associations.

He served as judge of the local courts for eight years, as secretary of the school board, as president of the Hutchinson Commercial Club, and as mayor of the city of Hutchinson. He also has taken prominent part in various other community matters. He is a Mason and an Odd Fellow.

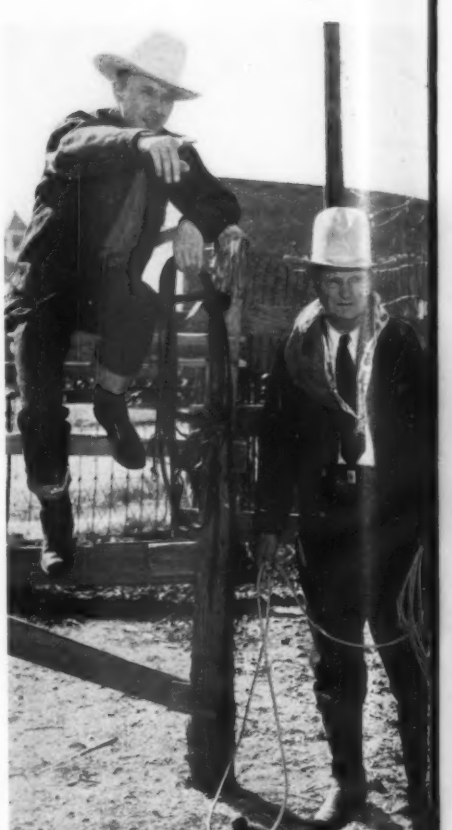
Among Mr. Clay's literary efforts in the early days was an entertaining and instructive series of articles published in TELEPHONY under the title, "Sundry Snapshots Along the Trail," during the decade from 1917 to 1926. They were invariably prefaced with a few stanzas of clever verse and discussed many phases of telephone work.

WARREN B. CLAY was born in Hutchinson, July 14, 1910. He received his education in the Hutchinson public schools and Carleton College. In 1927 he first commenced working for the Hutchinson company during his vacations from school. Since 1931 he has been employed by the company on a full-time basis as assistant manager. He became a director of the Minnesota Telephone Association three years ago.

▼

A. L. ROBB, owner and operator of the Electra Telephone Co., of Electra, Texas, has had associated with him for a good many years his son, **D. M. ROBB,** who now "handles a little over 98 per cent of the management of the company," according to the father's estimate.

The senior Mr. Robb is not a native Texan, as one might believe from the ease with which he wears the cowboy's outfit, "ten-gallon" hat, boots and all. Although born in Norris City, Ill., July 16, 1882, he could not resist the "call of the west" and has spent the major portion of his life amid the wide open spaces of Texas.



A. L. ROBB (to the right) has operated the Electra Telephone Co., Electra, Texas, since 1908. His son, D. M. (Dink to his friends), handles a little over 98 per cent of the management of the company, to quote his father's literal description of his duties.

W. S. CLAY (to the right), general manager of the Hutchinson (Minn.) Telephone Co., which he has operated for more than 40 years. His son, WARREN B., assistant manager, is a director of the Minnesota association.

Prior to engaging in the telephone business Mr. Robb served as brakeman and conductor in railroad train service. A little over 30 years ago—in June, 1908, to be more exact—Mr. Robb purchased the exchange at Electra, Texas, which then consisted of a North Electric 50-line magneto switchboard, serving 29 subscribers. The exchange experienced a steady growth in the ensuing years and now serves nearly 1,000 subscribers.

Mr. Robb has performed the numerous and varied duties of the average owner of a small telephone plant, including that of janitor,

ndent Telephone Industry

night operator, lineman, switchboard man and manager.

He has for years been active in state association work, serving as a director of the Texas Telephone Association for the past 10 or 15 years. In recent years he has become interested in farming and ranching. He is vice-president of the Electra State Bank, president of the Electra Federal Savings & Loan Association and boss of the Electra Chuck Wagon Gang, Inc. His hobbies include deer hunting and "any kind of outdoor life."

D. M. ROBB, known as "Dink" in Electra and vicinity, was born May 5, 1909, in the local telephone office and learned the rudiments of telephone work at a tender age. After attending the Texas Technological College and the University of Texas, he returned to Electra "to further his telephone studies from the ground down," as his father literally expresses it.

After serving his apprenticeship at digging post holes, working as a combination man, doing all kinds of plant work, inside and out, including a touch of cable splicing, he was brought into the office "to learn where the money was made." And now, as has been mentioned, the junior member of this father and son combination handles a little more than 98 per cent of the management of the company.

Dink is married, having one future operator in his family but as yet no lineman to help carry on the work of furnishing communications facilities to the populace of Electra and the surrounding countryside. Like his father, he is fond of the outdoor life, but his real hobby is amateur photography.

The Robbs enjoy the honor and distinction of being the only father and son combination serving as directors of the local chamber of commerce. Dink resigned as president of the organization early this year because of the multiplicity of his duties and interests.

Accused of all being cowboys because of being in the "near West," the Robbs and about 25 local men joined together in an incorporated organization known as "the Electra Chuck Wagon Gang" to "preserve the spirit of the Old West." This is, in part, a civic organization and in part a social club, for the enjoyment of its members.

THIS IS THE SIXTH of a series of articles featuring "Fathers and Sons in the Independent Telephone Industry." . . . Through the publication of pictures of fathers and sons, with brief biographical notes, TELEPHONY is introducing these sons—the younger generation—to one another and to the field.

As to its civic duties, the organization entertains at practically all the larger gatherings with real, old-style western-type dinners — the menu usually consisting of beans, stew, apricots, coffee, pickles, etc. During November the "gang" fed and entertained about 1,400 persons through the Electra Chamber of Commerce.

Then for the simple pleasure of the organization's own members, the gang occasionally takes the "Chuck Wagon"—a fully-equipped rolling kitchen—out to a nearby ranch for an over-night stay. A replica of a prairie schooner, the chuck wagon has been christened the "Prairie Belle."

"It is on these occasions," writes A. L. Robb, "that my son and I really get together. The outdoor part especially appeals to me and he is the official photographer of the organization (photography is his real hobby), getting photographs that help us to re-live our gatherings."

This explains the regalia which the Robbs were wearing when the "self snapshot" on the opposite page was obtained. All members of the chuck gang are equipped with cowboy boots, blue denim suits (with the organization's name lettered on the back and individual names above the jacket pockets), flaming red silk shirts and kerchiefs, topped with "ten-gallon" hats. Practically every member maintains from one to four saddle horses.

Commenting facetiously upon the accompanying father and son picture, A. L. Robb says: "I might call your attention to the fact that we are doing in the photo about what happens in the telephone business. The 'old man' is about to lasso the horse, while the son is ready to bridle the animal and lead it away."

▼

DR. CLARENCE L. JONES—veteran Ohio Independent telephone man with 40 years of experience to his credit—has had his son, **ROLLAND S. JONES,** associated with him since his high school days. Dr. Jones is secretary and manager of the Athens (Ohio) Home Telephone Co. while Rolland is now serving as vice-president and superintendent.

ROLLAND S. JONES was born in Athens December 31, 1902, and after completing his grade and high school work in the Athens schools, continued his studies at the Ohio University, also in Athens. During his high school and college days he worked at various telephone jobs and progressed from one to another,

DR. C. L. JONES, secretary and manager of the Athens Home Telephone Co., provided the city of Athens, Ohio, with its first telephone, more than 40 years ago.

← ROLLAND S. JONES, superintendent of the Athens company, has been interested in the telephone business since a boy. He was recently elected vice-president of the Athens Chamber of Commerce.

obtaining essential telephone experience in the years following graduation from college.

When a young lad of less than seven years, Rolland and his twin brother, Robert, attracted much attention at the annual convention of the Ohio Independent Telephone Association, held at Columbus, in March, 1909, where they appeared in the garb of telephone linemen, with pliers, screw drivers and other tools in their belts and the name, "Home Telephone Co., Athens" imprinted on their overalls. Robert was, unfortunately, killed some years ago in a coasting accident.

Serving as superintendent of a company of five exchanges and 3,500 stations is a man-size job, and it is not surprising, therefore, to learn that Rolland has only one hobby—fishing. He is a member of the Ohio Independent Telephone Association and is interested in national as well as state association activities. Just recently he was elected vice-president of the Athens Chamber of Commerce.

It was in the dental office of Dr. Jones that Athens' first Independent toll station was installed. That was in 1898 and for two years thereafter this toll station furnished the city its only communication by telephone with the neighboring rural districts and towns in the southern and western parts of Athens county.

Dr. Jones was one of the organizers of the Athens Home Telephone Co. which, in 1901, began operating its first exchange in Athens, a 20-line magneto switchboard installed in a room 10 ft. by 20 ft. in size. Later this room housed 770 lines of equipment and is said to have had the distinction of doing more business to the square foot of space than any other exchange in Ohio.

In the early days of Independent telephony Dr. Jones was for a year associated with the Pomeroy & Middleport Telephone Co. He was also for a year with the Nelsonville & Murray Home Telephone Co., later taken over by the Ohio State Telephone Co.

In 1909 the Athens County company installed common battery equipment and in 1918, with the approval of the Ohio Public Utilities Commission, it purchased and took over the local properties of the Central Union Telephone Co. After the consolidation it had 1,800 telephones. The company is extremely proud of its record of not missing paying its regular dividend on its preferred stock throughout the many years of its existence.

Dr. Jones was graduated from the dental school of the University of Maryland, in 1895, after previously studying for five years at the Ohio University and one year at Rose Polytechnic Institute. He practiced dentistry for 20 years in and about the city of Athens.

He served as a director of the Ohio Independent Telephone Association for 15 years and was president for two terms. He was a director of the United States Independent Telephone Association for 10 years, retiring about two years ago. Dr. Jones is vice-president of the Security Bank of Athens and a past president of the local Rotary Club.

One of his hobbies is ancient automobiles. He has the distinction of driving the first car in southeastern Ohio 35 years ago.

A Year of Progress In the Industry

(*Continued from page* 10)

phone service to the public as they permit more efficient operating; likewise, the new owners are in position to rehabilitate plants whenever necessary, thus placing them on a modern service basis. The purchase of rural lines from farmer owners by exchange companies will provide greatly improved and continuous service in rural territories.

Bell Rate Cases in the Courts

Of the Bell rate cases which have been before courts and commissions for a period of years, only one remains unsettled. That is the statewide rate case of the Wisconsin Telephone Co. Progress has been made toward its eventual settlement.

Early in the year the Dane County Circuit Court at Madison held that the rate cuts ordered by the commission were illegal and the commission was permanently enjoined from enforcing them. The depreciation rate order of the commission, however, was upheld by the court. The commission has appealed the court decision on the rate reductions to the Wisconsin Supreme Court, where the case now rests.

The Ohio Bell Telephone Co. rate case, which has been in controversy for about 14 years, was finally brought to a close during the year by an agreement between the company and the commission last April. A refund of approximately $7,500,000 was agreed upon for some 500,000 subscribers in 44 cities and towns.

The refund was held up, however, until the middle of this month due to protests filed in the Ohio Supreme Court by officers of labor unions in Cleveland. The state supreme court in late October refused to permit the intervention of the Cleveland labor unions, thus removing the last obstacle to the company refunds. Mailing of checks for these refunds was commenced December 15.

In Oklahoma, the commission orders reducing rates in Tulsa and Oklahoma City, which were appealed to the state supreme court and remanded for further investigation, were finally settled by a new order reducing rates and requiring refunds. The reduction of company revenues amounted to an estimated $350,000 annually.

The Southwestern Bell Telephone Co. filed application early in the year for an increase in 14 of its exchanges in Oklahoma and this was denied by the commission. Appeal was taken to the state supreme court in August and a writ of supersedeas was denied the company in October. Appeal was then made to the federal circuit court and a hearing was held before the federal statutory court December 19. The court took jurisdiction and appointed a special master to hear the case.

Toll rates of the Bell Telephone Co. of Pennsylvania were ordered reduced in January by the Pennsylvania Public Utility Commission to conform with the schedule of the A. T. & T. Co. The order applied to all rate charges in excess of 10 cents. In October the Pennsylvania Supreme Court was asked to review and reverse the order. Arguments were heard and the case was taken under advisement.

The Michigan Bell Telephone Co. was ordered in late June by the state commission to reduce its intrastate toll rates to the level of the interstate rates, resulting in an estimated decrease in Michigan Bell revenues of $550,000 annually. The order was appealed to the circuit court.

The New England Telephone & Telegraph Co. was ordered in early June by the Rhode Island commission to reduce its rates on extension sets from 75 cents to 63 cents. The company refused to accept the order and appealed immediately to the state supreme court.

Bell Rate Adjustments and Investigations

In Tennessee the rate case of the Southern Bell Telephone & Telegraph Co. was settled by compromise in January after seven weeks of hearings and one week of negotiations. The Bell annual revenues in Tennessee were cut an estimated amount of $500,000 through reduction of intrastate toll rates and service connection and move charges.

In North Carolina the state commission in August ordered the Southern Bell Telephone & Telegraph Co. to reduce its intrastate toll rates and extend base rate areas in three cities.

In Georgia the Southern Bell Telephone & Telegraph Co., through conferences with the commission, agreed to the estimated decrease of annual revenues of $114,000. This reduction was effected by elimination of the handset charge, and of extra charges for bells and gongs, and reducing the charge for extension sets.

In Kentucky conferences between the commission and the Southern Bell Telephone & Telegraph Co. resulted in a reduction of intrastate toll rates an estimated annual amount of $36,500.

State-wide investigations of Bell rates and practices were also in progress in Pennsylvania and West Virginia. Hearings commenced in July on rates and practices of the Bell Telephone Co. of Pennsylvania.

After a three-year investigation of accounts, inventories and rates of the Chesapeake & Potomac Telephone Co. in West Virginia, hearings commenced in early August. In late November the company's application for increased rates was denied.

In New York state investigation was commenced of the short-haul toll rates of six up-state companies. A hearing was held in late October and continued this month.

The Indiana Bell Telephone Co. in April asked the commission to place its investigation of the company on a state-wide basis, instead of on an individual exchange consideration. Hearings were held during May and June and were resumed in September, continuing during the fall. They were interspersed with conferences.

Early this month the commission ordred rates reduced in 22 cities to effect an annual reduction of the company's revenues amounting to an estimated $350,000.

In several states where action had not already been taken, the extra charge for handsets was reduced or ordered eliminated. In October the Wisconsin commission ordered the Wisconsin Telephone Co. to remove the extra eight-cent charge for handsets, following which a rehearing was asked by the company and granted by the commission. Later the order was indefinitely suspended.

Charges Made for Hotel Service and Calls

Two cases involving rates on hotel calls were the subject of commission orders in Arkansas and New York. The Arkansas commission in February limited charges on hotel calls to five cents and made rate changes decreasing the revenues of the Southwestern Bell Telephone Co. from hotels $7,700 annually. The case was appealed by the company to the state supreme court in April.

After a number of hearings during the year in its investigation of rates of the New York Telephone Co. for service rendered to and through hotels, the New York Public Service Commission issued an order in early December.

This order limited extra charges on toll calls to and from hotels to five cents on calls up to 50 cents in amount and to ten cents on calls above that sum. Local calls from hotel lobbies were limited to five cents. The order becomes effective January 1, although a rehearing was granted by the commission December 24 at the request of hotel associations. It will be limited to receipt of evidence not available at the last hearing.

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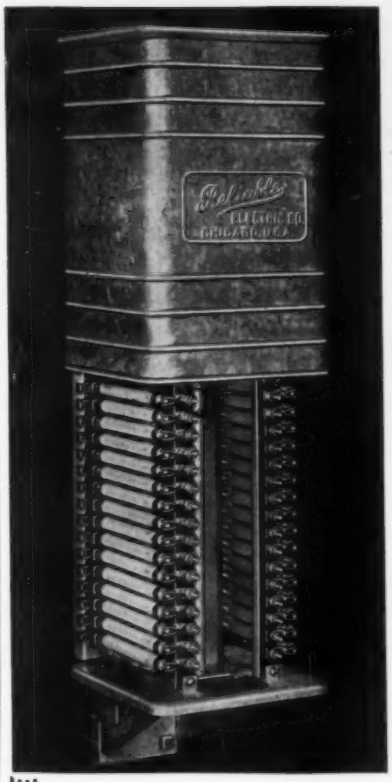
Direct Radiophone Service to Australia

Direct radio telephone contact between the United States and Australia was opened on December 20, when the American Telephone & Telegraph Co. and Amalgamated Wireless, Ltd., placed in service a new short-wave circuit between San Francisco and Sydney. Greetings were exchanged between government and telephone officials in Washington, Sydney, Melbourne and Canberra, after which the circuit was opened for use by the public.

The new route shortens the circuit distance by about 4,000 miles, and clearer operation is expected. Because of the saving in miles, a new circuit three-minute rate for San Francisco-Sydney conversations has been announced. It is $21 for week days and $15 on Sundays. Atlantic seaboard charges will be somewhat greater.

Until the new Pacific Ocean channel opened all calls between this country and Australia were routed over the existing circuits: New York-to-London, and London-to-Sydney radio beams.



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BELL TECHNICAL DEVELOPMENTS DURING 1938

(*Continued from page* 15)

the protectors discharge the moment the voltage rises to a critical value and then the immediate action of the short-circuiting relays prevents the protector blocks from creating a permanent ground. The relay, of course, releases as soon as the voltage has dropped.

Several installations of these short-circuiting relay protectors have been made; and, over a period of years, their operation has been found to be effective in limiting the voltage to ground along the line and in reducing lost circuit time. In some instances more than a thousand operations have been recorded without the necessity of changing a single carbon protector block.

New Transmission Circuit Measuring System

Transmission measuring is carried out by supplying a standard testing power to one end of a telephone circuit and measuring the power received at the other end. The ratio between these powers, expressed in decibels, is a measure of the transmission loss or gain in the circuit.

The sending power for measuring is ordinarily .001 watt and the received power ranges from .0001 to .00001 watt. Either the meters employed must be very sensitive or the power must be amplified before measuring.

Recent development work has produced new testing methods and apparatus which greatly simplify and expedite transmission measuring. Improvements have been brought about chiefly by more sensitive meters, the copper-oxide rectifier and the negative feedback amplifier. Transmission losses of at least 20 db can now be measured without an amplifier.

The use of copper-oxide rectifiers in many instances where vacuum tubes or thermocouples were previously used has simplified and reduced the cost of the measuring apparatus. For toll circuit testing in the larger offices a feedback amplifier is provided in the receiving circuit. This gives a remarkably stable circuit.

The importance of improved measuring devices is indicated by the fact that with the numerous portable transmission measuring equipments and transmission test boards now in use in the Bell System on the order of a million measurements are made annually.

A Recording Transmission Measurement System

Manually-operated devices have been employed for many years in making transmission measurements on telephone circuits. In recent years these devices have been equipped with meters calibrated directly in decibels. Manual devices have been quite satisfactory for the single-frequency measurements commonly used in routine maintenance.

If, however, measurements on telephone repeaters or circuits are required at a large number of frequencies, and if these measurements are required frequently or in large numbers, an automatic recording system can save a large amount of time as it plots the transmission frequency characteristics directly. Such a recording system may be used also for continuous single - frequency measurements on a circuit to show its variation with time.

An automatic recording meter has recently been placed in commercial use to meet the special needs of telephone circuit testing. It is extremely fast in operation; and this high recording speed is made possible by making the record without actual contact with the paper and, therefore, without friction. The record is made by means of an electrically-heated wire placed at the end of a pointer which moves over heat-sensitive paper.

The heat-sensitive paper is a colored paper coated with white wax which before exposure is nearly pure white. Application of heat causes the wax to melt and to be absorbed by the paper, making a distinct colored trace. The temperature of the wire is regulated to suit the rate of movement of the heated wire with respect to the paper.

Transmission frequency measurements on circuits and repeaters can be made with this recording system in less than one-tenth the time required with manually-operated apparatus.

Higher Magnetic Permeabilities

Extensive study has been made by the Bell Telephone Laboratories of the remarkable magnetic properties of certain alloys of iron and nickel, known as the "permalloys," one of the outstanding characteristics of which is their high permeability under conditions of apparatus use in the telephone plant.

Recently by combining in a single material several of the factors on which high permeability depends a substance has been obtained experimentally which has ten times the permeability of the best previous commercial types. This experimental material is a single crystal or permalloy which contains 66 per cent nickel. After certain heat and magnetic treatment this preparation showed a permeability of 1,330,000, which compares with unity for air and 5,000 for ordinary magnetic iron.

The principal value of this experiment at present is to confirm the principles which have been arrived at by other studies and as a result show that the separate factors which determine the remarkable magnetic characteristics of permalloy are additive in their actions.

Magnetizing Device

Permanent magnets are now employed in a great variety of shapes in telephone apparatus. Where the shape of the core permits it, such magnets can most easily be magnetized by placing them between the poles of a powerful electromagnet.

Where because of the core shape such a method cannot be employed to provide the desired flux, it is necessary to place a temporary winding around the core and then to secure the desired magnetization by passing a heavy current through this winding.

Such temporary windings, in the interests of economy, should have as few turns as possible, and this means securing the needed ampere-turns by using a very large current. Magnetization, as it is well known, takes place practically instantly and the duration of the magnetizing current is not important.

Recently a condenser magnetizer was developed in the Bell Telephone Laboratories which employs the first half-cycle of the condenser discharge. Currents as high as 4,000 amperes have been passed by this magnetizer but, since their duration is only about one-thousandth of a second, no serious heating occurs. This apparatus has been found easy to operate and has simplified the magnetization of many types of cores where the usual methods could not be employed.

Crossbar Dial System

Further progress has been made during the year in improvements of the crossbar dial system. During the year two new dial central offices employing this system were placed in service.

The first of these is in a residential area in New York City and at the time of conversion served about 1,500 telephones. The second office serves about 16,000 telephones in one of the busiest sections of New York City from the standpoint of telephone traffic.

After the equipment for commercial service was installed in these two offices, but before it was cut into service, extensive tests were made to demonstrate the ability of the equipment to meet service requirements and to correct any defects in the equipment or its installation.

In the larger office these trials included the dialing of about 300,000 test calls. This testing required a force of 20 specially-trained girls. Experience since cutover in both offices has demonstrated excellent service results.

New Dial PBX

A new dial private branch exchange was made available to Bell companies during 1938 for residences and smaller business houses. This new equipment employs the crossbar switch and the new "U-type" relay. This new PBX has a capacity of four trunks and 20 station lines. Its power requirement is less than that of types previously available, and it is expected that the maintenance effort required will be reduced.

This PBX is designed to employ a telephone set on which are mounted the dial and key buttons used to set up the various trunk and local calls. One of these buttons is used for local calls, one for holding, and the others for making connections to the four trunks.

Three classes of trunk service are available for the stations. "Non-lock-out" service allows the station to connect to a trunk whether it is busy or not, "lock-out" service allows the station to connect only to idle trunks; and "restricted" service prevents a station from making outgoing trunk calls, but allows it to answer or transfer incoming calls, or pick up transferred trunk calls.

Permanent Magnet Machines for Exchanges

Motor-driven 20-cycle alternators are commonly employed for supplying ringing current in telephone offices. The fields for these machines are usually supplied either by self-excitation or from a central office battery.

Recently a new generator set has been developed which avoids the necessity of employing field excitation current by employing permanent magnets to supply the field flux. This, of course, could always be done using the long horseshoe magnets similar to those in hand magnetos.

The new machine, however, employs a new magnetic material with very high coercive force so that very short magnets can be employed. The machine thus made available has an outer frame, the dimensions of which are not appreciably changed from those of the current excited machine.

A similar construction has also been adopted for certain types of regulators employed in the central office. This new design gives good results both from the economic point of view and from that of improved operation.

Telephone Instruments of Bell Companies

During 1938 the introduction of improved transmitters and receivers for use at Bell subscribers' stations continued at a high rate. There are now about 7,500,000 of the improved transmitter unit and about 1,500,000 of the improved receiver unit in use in the plant. These new units are adapted to all types of telephones, including handsets, desk stands and wall sets.

In addition to being simpler than the earlier transmitter, the new unit has very desirable characteristics, such as performance less affected by angular position, less effect of carbon aging under conditions encountered in service, higher efficiency and more uniform response and material reduction of modulation products resulting from nonlinearity.

The new receiver unit is of the bipolar permanent magnet type. The pole pieces are of permalloy and the bar magnets and diaphragm are of other special magnetic alloys. The coils are of enameled wire interleaved with cellulose acetate.

The particular designs for these new instruments have been selected from a wide range made possible by new design technique, materials and manufacturing methods. This selection has been based on methods relating primarily to performance in service rather than on laboratory tests.

The anti-sidetone circuit which is being rapidly introduced into the Bell plant is used both with the instru-

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ments just discussed and with other types now in the plant.

Characteristics of the new station circuit, which are of particular importance from the transmission standpoint, are: First, the reduction in sidetone which has been accomplished with minimum transmission loss and with many advantages under all usual types of plant conditions; and, second, reduced susceptiveness to electrical interference for certain types of party-line sets.

Movable Telephone Booths

Several of the Bell companies have provided readily movable telephone facilities for use at large gatherings, such as automobile and boat races, where adequate permanent facilities are not always practicable.

One company has equipped a trailer with five telephone booths. Before the event is to take place this is moved to the site and proper connection made. In this trailer each booth is equipped with a seat, fan and hand telephone set. An attendant in the trailer facilitates the handling of calls and charges.

Department Store Telephone Service

During 1938 new equipment was made available by Bell companies which greatly facilitates the handling of department store order service. In this new equipment each telephone order clerk is individually responsible for handling telephone calls on only the single incoming line that terminates on her desk.

Distribution of customers' calls to the order clerks is done at an associated PBX equipped with lamps to indicate order clerk positions not busy. Equipment is provided so that order clerks can call out on another line to obtain information while the customer is waiting on the order line.

Toll Dial Operation

For some years the Bell System has had step-by-step toll tandem networks in service in Connecticut and in Southern California.

During 1938, a form of toll-line dialing which can be used on trunks that are a part of the national toll network was introduced on a number of groups in Ohio. The principal points at which this service has been introduced are Dayton, Springfield, Columbus, Cleveland, Akron and Canton.

The toll operator in the originating office obtains directly by dialing, the called telephone in the distant exchange. The results of this method of operation are very satisfactory.

Storm and Flood Damage in 1938

The year 1938 has seen an unusual amount of damage to telephone plant from storm and flood. In the early part of the year the Pacific Coast area suffered severely from floods and telephone plant in the central states was considerably damaged by sleet storms.

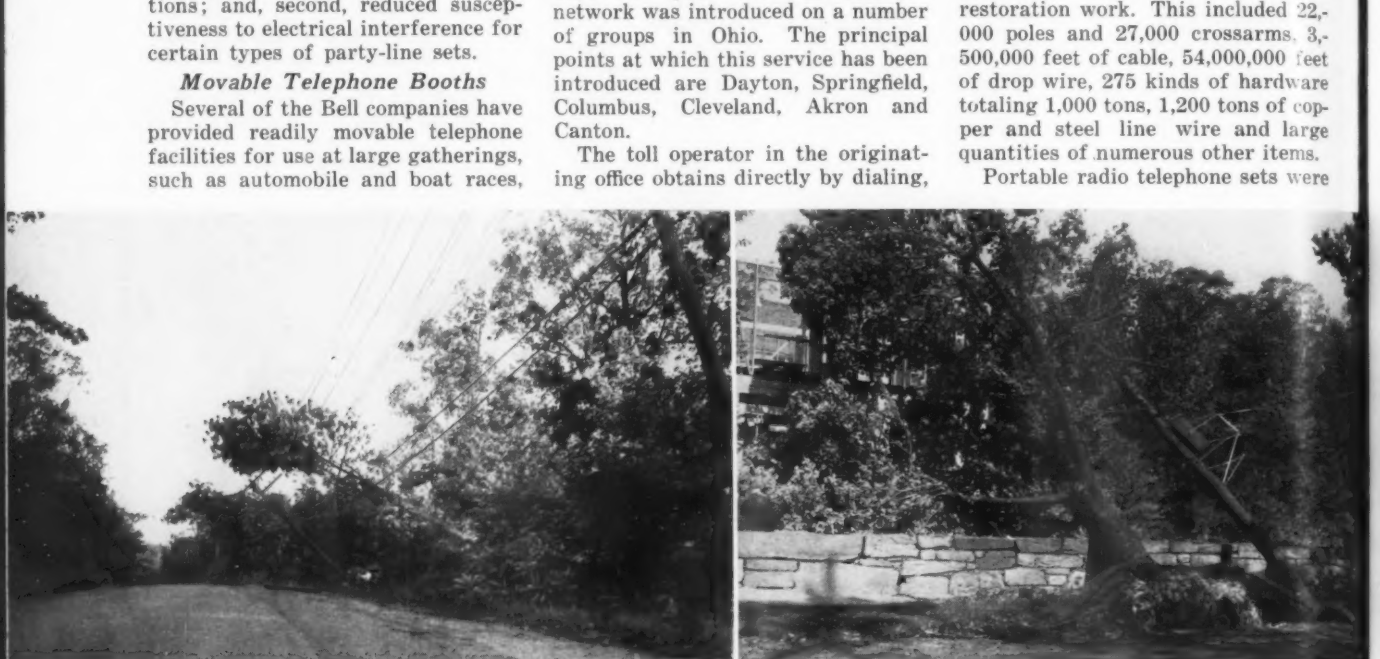
The outstanding damage of the year, however, was the September hurricane which visited the northeastern states. In the number of service interruptions and damage to the telephone plant this storm was the most destructive which the telephone plant in this country has experienced.

Due largely to wreckage of aerial wires and cables by falling trees, more than 500,000 telephones were put out of service. A few central offices were damaged by floods accompanying the hurricane, which also caused serious damage through bridge failures and otherwise to lines and cables, including several important trunk cables.

Nearly 2,500 telephone employes and more than 600 motor trucks and 200 trailers were sent by highway and rail into the stricken areas. These came from states as far away as Nebraska and Virginia.

Enormous quantities of telephone materials were necessary for the restoration work. This included 22,000 poles and 27,000 crossarms, 3,500,000 feet of cable, 54,000,000 feet of drop wire, 275 kinds of hardware totaling 1,000 tons, 1,200 tons of copper and steel line wire and large quantities of numerous other items.

Portable radio telephone sets were used to great advantage in this emergency. For example, the first telephone service from Keene, N. H., after the storm, was provided over a radio circuit which made connection to the wire telephone network at Gardner, Mass. This arrangement handled about 600 messages.



A joint telephone and power lead in Dedham, Mass. (left), and a terminal pole with overhead cable in Newton, Mass. (right), went down before the violent hurricane and floods which swept along the Eastern Coast of the United States early in the fall.

Coastal Marine Service

One of the first steps toward giving a coastal and harbor telephone service was the opening of a station at Green Harbor, Mass., in 1932 which provided telephone communication for Boston Harbor and for coastwise shipping along the New England coast. Subsequently, Bell System stations were opened at New York, Miami, Los Angeles, San Francisco and Seattle. A station at Norfolk was opened in June, 1938.

Other stations are in operation at Lake Bluff, Ill., Lorain, Ohio (both independently owned and operated) and Philadelphia. The stations on the Atlantic coast are equipped to dial the vessels called so that the service to ships is substantially the same as that provided on shore.

Recently, there has been made available improved ship equipment. In addition, there have been made available two lower-powered sets to provide essentially the same type of telephone service to small vessels such as harbor tugs, pilot vessels and small yachts which ordinarily operate at shorter distances from a radio shore station.

The smaller of these equipments is entirely self-contained and operates from a 6 or 12-volt storage battery. With these sets conversation is carried on in the same manner as in the larger installation except that there is no automatic transfer from receiving to sending and a switch in the handle of the handset must be pressed when talking.

A total of about 800 boats are now equipped for harbor and coastal service, of which over 700 normally operate in coastal or harbor areas which are served by Bell System owned and operated radio stations. All of these 800, however, have access to the country's telephone network.

Teletypewriter Exchange Service

Growth of teletypewriter exchange service continued during 1938 and approximately 500 new stations were added, giving a new high of about 12,500 commercial stations. Also, about 15,000 miles of telegraph circuits were added to the network and further progress was made in eliminating temporary switching arrangements.

Three switching arrangements of a new type were placed in service in Aberdeen, Wash., Lewiston, Idaho, and El Centro, Calif. In addition, new systems were standardized which improve service to stations at outlying points and which provide local station supervision over all types of long telegraph lines to these stations.

A new teletypewriter, known as the No. 26, was made available. This machine is smaller, quieter, and more economical than the machine previously standard.

A number of miscellaneous improvements were made available, including improved conference networks, new switchboard operators' training equipment, improved toll line signaling arrangements, a new line of radio suppression filters for teletypewriters, and improved testing arrangements for teletypewriters and switchboards.

Coordination of Power and Telephone Systems

Further important progress was made during the year on inductive and structural coordination problems through the cooperative work of the Edison Electric Institute and the Bell Telephone System.

The Joint Subcommittee on Development and Research carried further its studies of effects, from a coordination standpoint, of grounding street-light brackets, and of bonding telephone cable sheaths to multi-grounded power distribution circuit neutrals.

Reports were completed on short-circuiting relay protectors and on the coordination of rural power and telephone systems at noise frequencies. In connection with the latter problem, application in practice of methods recently developed has yielded effective results.

Phase-shifting transformers were applied with marked success during the year, to secure wave-shape improvement in the power supply to large rectifier installations. Further progress has been made in providing protection to communication circuits serving the plants of the electric power companies.

Of much interest in connection with coordination problems is the work on revision of the National Electrical Safety Code, carried on during the year under the procedure of the American Standards Association.

▼ ▼

Committee Appointed to Plan Oklahoma Program

Several program features for the 1939 convention of the Oklahoma Telephone Association, to be held in Oklahoma City March 27 and 28, were arranged at a meeting of the association board of directors at Oklahoma City December 9.

A convention committee was appointed with C. E. Devin, Apache Telephone Co., Apache, as chairman. Mr. Devin designated L. J. Bullis, Oklahoma City, Southwestern Bell Telephone Co., and H. W. Hubenthal, secretary of the Oklahoma association, as a sub-committee to make arrangements for a meeting place, program, entertainment and banquet features.

M. A. Sanders, Southwestern Bell Telephone Co., Oklahoma City, was appointed to arrange for a golf tournament for Sunday, March 26.

▼ ▼

Telephone Percentage Small in Low-Wage Group

Of employed white workers' families in Dallas, Texas, having an average annual income of $1,475, 59 per cent of those who rent their homes and 42 per cent of the home owners had no telephone, according to a recent survey made by the Bureau of Labor Statistics.

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THE Gray Pay Station (No. 23-D) illustrated below is for either magneto or central battery manual exchanges. It is of the post-pay type.

No special central office equipment is required for the operation of this pay station. It contains cable, terminal block, mountings, etc., and necessitates the addition of only the transmitter, receiver and ringer box.

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NORTHERN ELECTRIC CO., LTD., Halifax, Montreal, Toronto, Winnipeg, Regina, Calgary, Edmonton, Vancouver
Or any other telephone supply house

Commission and Court Activities

Bell Supplemental Brief on Walker FCC Report

On December 21 the Bell filed a supplement to its brief filed December 5 on Commissioner Walker's proposed report on the Federal Communications Commission's telephone investigation. The supplement includes and, in the main, is limited to misstatements and errors in the Walker report which are outside of the field of the brief.

It was endeavored to keep the supplement to the minimum by avoiding repetitious treatment of errors that occur more than once in the Walker report and by not attempting to indicate all the places where an erroneous statement is referred to or used in other sections of the report. Many items have been omitted, it is stated, where the Walker report carries forward positions taken by investigators with respect to which errors and omissions were pointed out to the commission in the "Comments pamphlets."

A class of errors not discussed in the brief or in the supplement includes those in the subject matter in Chapters 11, 16 and 17 of the Walker report which seem to relate directly to recommendations stated in that report with respect to which it is said that the commission has full jurisdiction and may take appropriate action in other proceedings. Certain plain misstatements, however, which are made in those chapters and which do not seem to relate to those issues that may later come before the commission, are pointed out in the supplement.

The principal portion of this supplement is in parallel column form—the left-hand column shows the point, usually by quotation from the Walker report, and opposite each such item the Bell comment on that point appears in the right-hand column.

▼ ▼

Acquisition of United by Southwestern Bell Approved

The Federal Communications Commission, on December 12, approved the application of the Southwestern Bell Telephone Co. for authority to acquire and operate all of the telephone properties, including interstate toll lines now owned and operated by the United Telephone Co. of Kansas, one of its subsidiaries.

The commission finds that the acquisition proposed will give the applicant direct ownership of the properties in question instead of control through ownership of stock and that when the subsidiary is finally dissolved, will simplify the corporate structure of the applicant's telephone system.

In its application, the Southwestern Bell proposes to take over all of the properties and assets of the United company, and in consideration therefor will surrender for cancellation the outstanding capital stock of the United company, cancel the note of such company which it holds and assume all of its outstanding liabilities.

The opinion states that the evidence indicates that the Southwestern Bell is financially able to acquire and operate the properties of the United company. The FCC made no finding whatever relative to the value of the properties proposed to be acquired but issued a certificate authorizing the transfer on the basis that the present and future public convenience and necessity require that the service be continued to the persons now served by the United company.

Transfer of the telephone plant, property and assets—toll as well as exchange—of the United company to the Southwestern Bell was approved by the Kansas Corporation Commission on January 8, 1938.

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Petition Filed in Refund Case of Oklahoma Bell

A. F. Sweeney and a group of other Tulsa, Okla., citizens filed a petition with the Oklahoma Corporation Commission, December 19, asking that $35,000 of last spring's telephone rate refund, which was retained by the commission to be credited to the general revenue fund of the state, be returned instead to subscribers of the Southwestern Bell Telephone Co., at Oklahoma City and Tulsa.

The group filed a mandamus action in the Oklahoma Supreme Court seeking to force the commission to return the amount which represents 10 per cent of the total refunds ordered by the corporation commission May 31, 1938, in connection with downward revisions of the Southwestern Bell company rates at Oklahoma City and Tulsa. The commission had ordered rate reductions and the company had posted a supersedeas bond guaranteeing refunds if it lost on appeal.

The state supreme court, on December 19, refused to grant the mandamus application to force the commission to refund the entire amounts. The court held in substance that the application the Tulsa patrons first should be passed upon by the commission.

Mr. Sweeney and associates claimed in their petition that Article 9, Section 21 of the Oklahoma constitution requires that the full amount of refunds shall be paid to the subscribers and that the statute providing that 10 per cent may be retained is unconstitutional.

Total refunds provided for in the order of May 31 were $226,471.99 to subscribers at Tulsa and $118,822.91 to subscribers at Oklahoma City. These refunds have been made with the exception of the 10 per cent now a subject of controversy.

▼ ▼

Seattle Denied Coastal Radiotelephone Station

Finding existing radiotelephone service of the Pacific Telephone & Telegraph Co. in the Puget Sound shipping area to be adequate, the Federal Communications Commission on December 20 denied the application of the city of Seattle for authority to establish a radiotelephone station, to be operated in the public coastal service for communication with ship telephone stations operating in Puget Sound and adjacent waters. This was a five to one decision.

In a dissenting opinion Commissioner Paul A. Walker stated that competition provided by the municipality would be in keeping with the spirit and purpose of the Federal Communications Act.

The original application requested a frequency of 2522 kilocycles which is the one licensed for use by station KOW owned and operated at Edmonds, Wash., by the Pacific Bell company. The application was later amended to specify a frequency of 2738 kilocycles.

The commission's findings were summed up in the following points:

1. The operation of a radiotelephone station on the proposed frequency would create objectionable delay and interference in the operation of existing ship stations licensed by the commission as well as to ship stations licensed by the Canadian government, which stations have a prior right to the use of the frequency in question.

2. The application is not consistent with the commission's rules and regulations or established policy, and no justification has been shown for a modification thereof.

3. The applicant has failed to show that effective service would be rendered to the public by the proposed station.

4. Existing radiotelephone facilities have not been shown to be inadequate.

5. Applicant has failed to show a substantial public need for the proposed service. The rates tentatively proposed, though slightly lower for some service, are without controlling significance when viewed from the standpoint of the rates and service to the area as a whole.

6. Public interest, convenience or necessity would not be served by the granting of the application.

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Physician's Claims Upheld In Business Rate Case

Holding that a doctor who maintains his office in his residence is entitled to the residential rate for his telephone and not the business rate, the appellate division of the New York Supreme Court, in an unanimous opinion handed down November 17, reversed the lower court which had dismissed the complaint of Dr. Henry C. Eichacker of Ridgewood, Queens, N. Y.

Dr. Eichacker sued the New York Telephone Co. to recover $209, the alleged difference between the business rate he paid over a period of 13 years and the residence rate to which he claimed he was entitled (TELEPHONY of April 2, 1938, page 29, and also TELEPHONY'S Directory for 1938, page 95).

The case of the complainant doctor was supported by many members of the Queens County Medical Society who regarded it as a test case.

The physician's counsel contended that the tariff of the New York Telephone Co. filed with the New York Public Service Commission established the right of a doctor with a bona fide residence to pay only residential rates and that it was the duty of the telephone company to have advised Dr. Eichacker which rate was the more beneficial to him.

The company had taken the position that the physician contracted for a certain type of service at his residence where he served patients and that it was not obligated to notify him about the residential rate.

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Bell Oklahoma Rate Increases in Federal Court

The United States District Court of the Western District of Oklahoma, with three judges sitting, at Oklahoma City, December 19, took jurisdiction of the case in which the Southwestern Bell Telephone Co. is seeking temporary exchange rate increases in 14 Oklahoma cities.

The court reserved a decision upon the application of the telephone company for a temporary injunction to restrain the Oklahoma Corporation Commission from enforcing an order preventing the company from putting in temporary rates in the 14 cities. It appointed Frank M. Bailey, of Chickasha, Okla., as a special master to hear the case and report his findings within 60 days, unless granted an extension of time.

This action of the court has the effect of preventing the Southwestern Bell from putting in effect temporary rate increases in the 14 cities unless the hearing before the master reveals the present rates are confiscatory or inadequate as claimed by the Bell company. It assures the company, however, of a complete hearing in the federal court on its claims that the present rates, which have been in effect for the past 19 years, are confiscatory.

Attorneys for the Southwestern Bell stated at the hearing that they had been denied a "plain, speedy and efficient remedy" in the Oklahoma state courts. Attorneys for the corporation commission contended that the company could secure relief, if entitled to it, in connection with a state-wide rate hearing which will start probably next June following completion of the present general investigation of rates of company pursuant to a resolution of the Oklahoma legislature.

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Bond Issue Authorized for Refunding Purposes

The Deposit Telephone Co., Inc., has been authorized by the New York Public Service Commission to issue not to exceed $43,500 principal amount of first mortgage 30-year 4½ per cent bonds, series A, for refunding purposes. The company owns and operates a telephone system in Delaware, Broome and Chenango counties, New York.

The company requested authority to issue $63,500 principal amount of mortgage bonds under a proposed mortgage, the proceeds to be used to refund by redemption on January 1, 1939, $43,500 principal amount of outstanding mortgage bonds and the balance, or $20,000, to reimburse its treasury for capital expenditures which the petition states were previously made.

At a hearing the company advised that for its present requirements an issue of mortgage bonds equal to the principal amount of the outstanding

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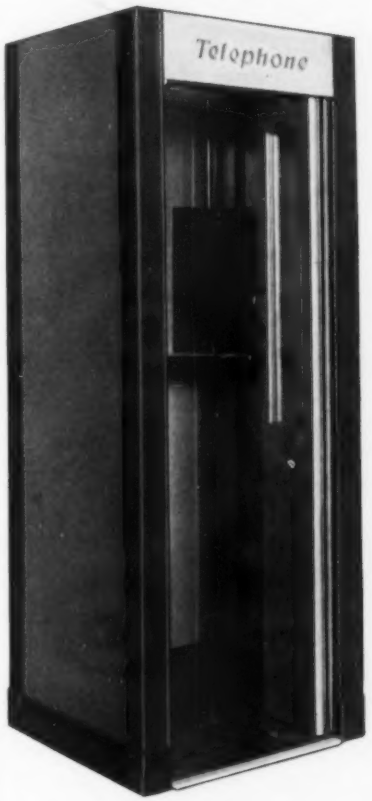

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mortgage bonds, or $43,500, would suffice, and that the reimbursement feature of the petition could await the completion of the examinations which were to be made by the commission's accounting and engineering divisions.

The company, requiring the refunding issue some time prior to January 1, 1939, the proposed redemption date, the commission approved a recommendation that authority be granted to the issue of not to exceed $43,500 principal amount of the proposed bonds, and that the proceeds be applied solely and exclusively to the redemption of an equal principal amount of outstanding 6 per cent mortgage bonds. The company's outstanding funded indebtedness consists of $43,500 principal amount of first mortgage 6 per cent bonds which mature January 1, 1948, all of which is to be refunded.

It was testified that funds in excess of the proceeds of $43,500 to be received from the refunding issue which are necessary to effect the refunding, or $3,480, will be provided by the company from other sources. The redemption premium, $2,175, together with the balance of unamortized debt discount and expense applicable to the outstanding bonds upon the refunding will be charged by the company to surplus account.

Costs and expenses of effecting the issue of the proposed bonds and the refunding of the outstanding bonds are estimated by the company at $3,900. The commission's report recommended that any authority granted should be conditioned upon the company reporting to the commission, for its approval, all costs and expenses in connection with the issue and sale of the proposed bonds and the proposed disposition of such charges. This requirement is contained in the commission's order.

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Central Office Equipment Not Personal Property

The California Supreme Court ruled, September 2, that the central office equipment of a large telephone company in California constitutes real estate and not personalty for tax assessment purposes, being improvements affixed to the land under section 3617 of the political code. This ruling was handed down in the case of the Southern California Telephone Co. vs. State Board of Equalization.

Such equipment, the court found, consists in part of a complex mass of interconnected wires, cables, electrical and other equipment which is contained in large central offices serving many thousands of subscribers. It constitutes, together with a specially-constructed building in which it is housed, and to which it is attached, a unit which in its entirety is improvement to realty.

The fact that equipment is sometimes moved and office locations changed does not militate against this conclusion, the court held. Absolute permanence is not required, said the court, notwithstanding the definition of the term "affixed to the land," in Section 660 of Civil Code, as embedded in land, or permanently resting upon it, "or permanently attached to what is thus permanent, as by means of cement, plaster, nails, bolts, or screws."

Excerpts from the court's opinion follow:

Physical facts, alone, do not afford the sole test as to whether equipment is attached to realty for tax purposes. Intent, controlling consideration in determining as between private persons whether an article is a fixture, is important in determining status for tax purposes.

The fact that central office buildings are constructed for special use by a telephone company favors permanence of location and attachment of fixtures. There are not available other buildings constructed for this specialized business. Special suitability of telephone offices restricts their salability for other purposes.

These factors strongly favor permanence of location of telephone offices. The great expense incident to the moving of the equipment in large office to other telephone office or to other position within the same building make for permanence of location of telephone equipment.

Other central office equipment, including head sets, breast sets and operators' chairs, which are readily portable and not attached by bolts or screws to the building, is likewise realty for tax purposes. Such property is specially designed for use in connection with attached portions of equipment. Most of it is not usable except with telephone equipment.

Other unattached equipment consists of heavy machines, such as charging and ringing machines, which, although not readily portable, are not attached to building by bolts or screws. The nonattached portions of the equipment and the attached portions together constitute a unit for use together and are improvements to realty. The detached portions of the equipment are constructively annexed.

The equipment in small offices, including switchboards, is not realty. The attachment of switchboard legs and equipment to floor or walls by screws or bolts does not make equipment improvement to real estate so as to constitute part thereof for tax purposes.

Central office equipment is not "telephone line" within exemption in definition of "improvements affixed to land" in section 3617 of the political code. The exception has reference to lines of the company outside the central office buildings, which lines are commonly located in or under public streets and roads or on right of way over private lands.

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Summary of Commission Rulings and Hearings

Federal Communications Commission, Washington, D. C.

December 12: It was decided to hold a hearing on the joint application of the Wisconsin Telephone Co. and of Edwin G. Beardmore acting for the Winnebago County Telephone Co., of Oshkosh, requesting a certificate that the acquisition by the Wisconsin company of the Winnebago County company will be of advantage to all concerned. No date was set.

December 12: The commission approved the application of the Southwestern Bell Telephone Co. for authority to acquire and operate all of the telephone properties, including toll lines, now owned and operated by the United Telephone Co. of Kansas, one of its subsidiaries.

The commission's certificate specifically describes the 21 toll routes for interstate traffic to be acquired by the Southwestern Bell from the United company, noting in a number of instances that they connect with lines of the Lincoln Telephone & Telegraph Co. as well as with the Northwestern Bell Telephone & Telegraph Co. and the Mountain States Telephone & Telegraph Co. At the Kansas-Nebraska boundary the toll lines of the United company connect with the Nebraska Continental Telephone Co., it is noted.

December 20: The commission denied the application of the city of Seattle for authority to establish a coastal harbor radiotelephone station, finding that existing facilities have not been shown to be inadequate and finding that public interest, convenience or necessity would not be served by the granting of the application.

Nebraska State Railway Commission

December 16: Application filed by Clearwater Telephone Co. for authority to increase business rates 50 cents a month on handsets, 40 cents a month on desk sets and 25 cents on wall instruments; accompanied by petition of patrons who consented to increase on condition that 24-hour service be granted.

December 17: Application filed by Lincoln Telephone & Telegraph Co. for authority to abandon its exchange at Glenvil and serve subscribers by direct wire from its Hastings exchange; accompanied by petition signed by 80 per cent of its 57 subscribers consenting to the change in service, and by showing of the company that due to a large decrease in subscribers present operation causes a heavy financial loss not justified by conditions.

December 22: Application granted of Lincoln Telephone & Telegraph Co. for authority to eliminate from schedule of rates at its Pleasant Dale exchange an unused rate of $2 a month for local and zone service.

December 22: In the matter of the

application of the Lincoln Telephone & Telegraph Co. for authority to abandon exchange at Thayer and serve patrons from Waco and York exchanges; commission found that this will tend to reduce operating losses in the area and 94 per cent of the subscribers having consented, application was approved.

New York Public Service Commission

December 19: The commission authorized the New York Telephone Co. to revise its schedules of rates for local service between Fort Ann and Glen Falls and between Fort Ann and Hudson Falls in Warren and Washington counties, effective December 15. A canvass having indicated that Fort Ann subscribers desire local service to Glen Falls, even at an increase in the monthly rate schedule, the commission authorized the company to increase rates in the Fort Ann central office district. The rates of 57 subscribers will be increased by 50 cents a month and those of the remaining 25 subscribers by amounts ranging from $1 to $3.50 per month.

December 19: The commission authorized the Macomb Telephone Co. Inc. to construct telephone lines in a portion of the town of Macomb, St. Lawrence county to serve the Aielle Brothers Cheese Factory and other subscribers. The cheese factory was formerly served by the Pope Mills Telephone Co. but it was complained that the service given was unreliable and inadequate.

December 19: Revised rate schedule filed by the Earlville Telephone Co., effective as of January 1, in Earlville and surrounding territory. Rates for business service and individual line residence service are increased 50 cents per month and rates for multi-party and rural line service are increased 25 cents per month under the provisions of the new schedule.

December 21: Revised rate schedule filed by the Morrisville Telephone Co., effective as of January 1 in Morrisville and vicinity. Rates for business service and individual line residence service are increased 50 cents per month and rates for multi-party residence and rural line service are increased 25 cents under the provisions of the new schedule.

December 23: Commission ordered a rehearing of its order directing hotels to reduce service charges for local and long distance calls, but directed that the reductions become effective January 1, as had been previously ordered. The rehearing, the request for which came from the New York State Hotel Association and the Hotel Association of New York City, will be held in New York City January 17. It will be limited to the receipt of evidence that was not available at the last hearing in the case.

Ohio Public Utilities Commission

December 19: The Adamsville Telephone Co. was authorized to increase its rates as follows:

Business individual, $2 to $4.25; business two-party, $1.75 to $3.75; business rural, $1.50 to $3.50; residence individual, $2 to $2.75; residence two-party, $1.75, discontinued; residence five-party (new), $1.75; residence rural, $1.50 to $1.75.

December 19: The Ohio Bell Telephone Co. was authorized to amend its toll tariff to show that Minford, Stockdale and Rareden now shown as subscriber stations are being changed to rate centers.

The Bell also was given authority by the commission to transfer from Middletown to the Franklin exchange certain undeveloped territory in which applicants are now appearing for the Franklin exchange.

December 19: The United Telephone Co. received authority to cancel an unused tariff for magneto service in the Lakeview-Russells Point exchange where all service now is automatic.

December 19: Authority granted the Columbia Mutual Telephone Co. to revise its tariff to provide for payment of bills at the office rather than at Central and to institute a discount for prompt payment.

December 22: The United Telephone Co., of Bowling Green, received authority to issue and sell at not less than 102, $400,000 of first mortgage bonds dated January 1, 1939.

The proceeds are to be used (1) to redeem at 104 the company's outstanding $295,200 of 6 per cent preferred stock; (2) in lieu of proceeds of $81,900 authorized in 1930, but unused (which authority the commission revoked) additional preferred stock to reimburse use of the money paid into the treasury for such sum of uncapitalized plant additions as of June, 1930; and (3) to reimburse the treasury for $2,900 additional uncapitalized capital expenditures as of October 31, 1938.

This authority is conditioned upon the company increasing its annual depreciation reserve account appropriation by the sum of $6,000, pending the further order of the commission, and the use of the money paid unto the treasury for the discharge of $91,850 of outstanding short term notes.

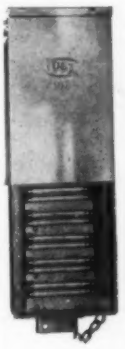
December 22: Authority was granted for consolidation of the Adamsville Telephone Co., the Frazeysburg Telephone Co., the Palmyra Telephone Co. and the Windham Electric Co. under the name of the Eastern Telephone Service Co.

The commission's order of authority set forth that the consolidated corporation should issue in exchange for the stocks of the constituent companies 3,465 shares of no par common stock at a state value of $62,370.

The existing rates of the Frazeysburg company, the Palmyra company and the Windham company, and the new rates of the Adamsville Telephone Co. are prescribed as the rates of the consolidated company.

December 22: Conditioned that the purchaser preserve the existing rates

COOK S-X
Protected
CABLE TERMINAL



The Cook S-X is a flat, compact 4, 5 or 6 pair terminal for use where you require just a few subscribers' drops. The S-X employs the Cook perfected method of insulation, protection and cable termination. Drop wire connections and lightning arresters are conveniently located at the front. The S-X is reversible; may be mounted with stub out of top or bottom.

TERMINAL AND PROTECTION EQUIPMENT

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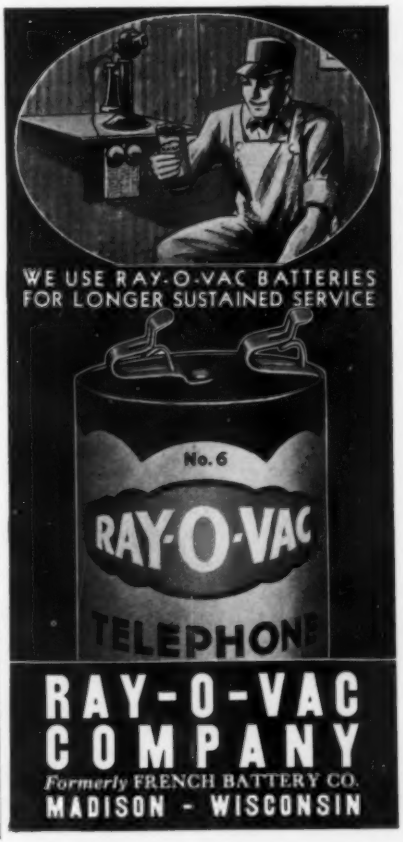


"Telephony's" Engineering Data

By B. C. BURDEN

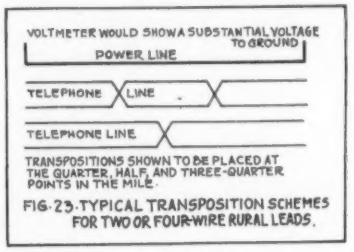
Index, Outside Plant Construction. December 31, 1938. No. 3-B, Page 20.

Coordination of Telephone and Rural Power Lines (Ctd.)

Transpositions in Telephone Circuits

In the foregoing it has been stated that power transpositions in multi-grounded systems are ineffective in reducing the magnitude of the voltage induced on the telephone circuit. From this it is obvious that inasmuch as power transpositions cannot be used to *neutralize* the voltage induced on telephone circuits, we must depend on telephone transpositions to *equalize* the voltage.

In other words, by transposing the telephone line at frequent intervals we can equalize the power voltage so that both wires have approximately the same voltage. Hence, the voltage available for circulating noise currents is small. The essential difference between telephone and power transpositions are shown in Fig. 22.


VOLTMETER WOULD SHOW A SUBSTANTIAL VOLTAGE TO GROUND
POWER LINE
TELEPHONE LINE
TELEPHONE LINE
TRANSPOSITIONS SHOWN TO BE PLACED AT THE QUARTER, HALF, AND THREE-QUARTER POINTS IN THE MILE.
FIG. 23. TYPICAL TRANSPOSITION SCHEMES FOR TWO OR FOUR-WIRE RURAL LEADS.

Due to unavoidable irregularities in spacing of transpositions, relative heights of power and telephone lines, etc., perfect equalization cannot be expected. Hence, there will always be some power voltage available to create noise. Incidentally, it is important to keep in mind that the reference is to *metallic circuit noise*, as distinguished from noise resulting from the power voltages acting through series and shunt unbalances.

The more frequent telephone transpositions are placed, the better the balance obtained; and, of course, the lower the noise tendency. Telephone transpositions must serve the dual purpose of crosstalk and noise reduction which, of course, makes a transposition arrangement for a multi-wire lead somewhat complicated.

In dealing with simple two-wire rural or toll leads involved in parallels with power lines, a very satisfactory plan is to transpose the circuit at the ¼th or ¾ths points between section corners. On four-wire rural leads one circuit should be transposed at the ¼th and ¾ths points in the mile, and

"Telephony's" Engineering Data

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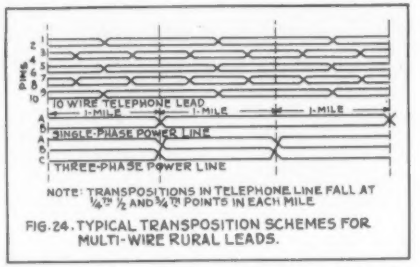

FIG. 24. TYPICAL TRANSPOSITION SCHEMES FOR MULTI-WIRE RURAL LEADS.

the others at the ½ mile (see Fig. 23). This gives both crosstalk and noise balance.

Where more than two circuits are involved some standard arrangement, such as one used by the Bell or large Independents, should be followed. These schemes provide both a crosstalk and noise balance for all circuits on the lead. Typical transposition schemes for multi-wire rural leads are shown in Fig. 24.

Summary

In summing up the case against inductive interference, four points are stressed which it is believed should guide Independent telephone men in coping with the inductive problem that has taken on new importance as the result of extensive rural power development. These points are:

(1) We can expect high induced voltages on telephone circuits paralleled by multi-grounded wye power systems. The amount of noise will depend largely on how well telephone lines are maintained from a series and shunt balance standpoint.

(2) A system of telephone transpositions will be needed on all parallels, to equalize the induced power voltages.

(3) Where telephone lines are maintained in a well-balanced condition and an adequate transposition scheme is used and yet exceptionally high noise levels are experienced, it is probable that the power system has abnormally high inductive influence. This may be due to faulty or poorly-designed generating equipment, overloaded transformers, motors with poor wave form, etc.

In such cases the power company or power district should be approached and asked to cooperate in solving the mutual problem of inductive interference.

Telephony's "Engineering" Data

By B. C. BURDEN

Index, General December 31, 1938 No. 48-A, Page 1

Magnet Wire Data

Magnet wire is available in the following types of insulation: Single cotton, double cotton, single silk, double silk, single enamel, double enamel, single cotton-enamel. The single cotton-enamel wire is quite popular as it will stand considerable abuse in winding. A table giving some of the principal characteristics of single cotton-enamel magnet wire is shown below. This table gives the feet per pound, ohms per pound, pounds per cubic inch, and ohms for cubic inch for various wire sizes A. W. G. from No. 9 to No. 40.

Miscellaneous Data for Single Cotton-Enamel Magnet Wire

Size A.W.G. No.	Feet Per Pound	Ohms Per Pound	Pounds Per Cubic in.	Ohms Per Cubic in.
9	24.57	.0195	.2175	.00422
10	31.03	.0310	.2142	.00664
11	39.02	.0492	.2145	.01047
12	49.09	.0780	.2131	.01651
13	61.73	.1236	.2045	.0251
14	77.8	.1946	.2007	.0393
15	97.6	.3108	.1946	.0609
16	122.9	.4036	.1950	.0966
17	154.6	.783	.1937	.1508
18	194.6	1.243	.1860	.2326
19	243.9	1.964	.1826	.3560
20	305.8	3.104	.1754	.5440
21	381.7	4.896	.1706	.8310
22	483.1	7.80	.1700	1.354
23	602.0	12.26	.1712	2.066
24	758.0	19.46	.1641	3.150
25	943.0	30.52	.1588	4.820
26	1176.0	47.99	.1537	7.318
27	1477.	76.02	.1479	11.08
28	1832.	118.90	.1416	16.74
29	2299.	188.12	.1332	24.91
30	2857.	294.8	.1281	37.08
31	3559.	463.0	.1227	55.40
32	4367.	717.0	.1162	81.35
33	5388.	1115.	.1113	120.8
34	6532.	1704.	.1042	175.
35	7692.	2531.	.0987	251.7
36	9158.	3799.	.0933	364.2
37	10989.	5748.	.0908	522.
38	13038.	8600.	.0869	735.5
39	15060.	12527.	.0847	1048.
40	17065.	17901.	.0796	1461.

of the seller, the application of the Northern Ohio Telephone Co. to purchase and issue $37,700 6 per cent preferred stock for all of the property of the Greenwich Farmers Telephone Co. was authorized.

This authorization was upon the basis of a capitalizable consideration of $22,600 and the issue and sale at par by the purchaser of this amount of the preferred stock.

December 23: The Ohio Associated Telephone Co. was authorized to buy all of the property and assets of the Minster Telephone Co. The commission retained jurisdiction in the matter for the purpose of determining the value involved.

January 5: Hearing on application of the Ohio Bell Telephone Co. to establish increased rates at Mongolia and Waynesburg. The application was certified by the commission secretary December 20.

Pennsylvania Public Utility Commission

December 28: Initial hearing in Harrisburg on a new uniform system of accounts, including a list of units of property for retirement purposes, for telephone companies having annual operating revenues exceeding $25,000 but not exceeding $50,000.

December 28: Initial hearing in Scranton on joint application of The Bell Telephone Co. of Pennsylvania for authority to purchase and the Thornhurst & Gouldsboro Telephone Co. to sell all its property located in the borough of Gouldsboro, townships of Lehigh and Clifton, Lackawanna county; township of Lehigh, Wayne County; and township of Coolbaugh, Monroe County.

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IN THE NATION'S CAPITAL

(*Continued from Page* 17)

gaged in a swing program. Snow White opened the window when the Queen knocked on the door and said:

"Scram, granny, the boys don't like any company except me."

"And who are you to tell me off?" cackled the Queen.

"This is coming to you by authority of the Seven Dwarfs Association," sing-songed Snow White. "Now get the heck off the grounds before I pull the hair out of your ears, you batty old hag."

"Okay, Dearie," cooed the Queen, "but get a load of this before you sign off." And with that she flashed the Big Apple.

Snow White's eyes began to bulge out of her head like a tramped-on frog. And before you could say, "Association of Composers, Authors and Publishers," Snow White had gobbled up the whole mess, and went down quicker than Micky Finn's mother-in-law. The Queen of the Fourth Estate streaked back to her own castle, fixed herself up pretty again, and came out with an extra "who-done-it" edition, denouncing police laxity, etc., etc.

Of course, the Big Apple was nothing but a Congressional Investigation in disguise. The poor Dwarfs, warned by the Little Democrats, hurried home trying to save Snow White, but when they got there it was too late. The poison was already working. So the Dwarfs laid her out and went through a post mortem investigation of their own, in which they denounced everybody (including Snow White for being so careless), and then sat down and waited for the worst.

"I'm afraid this time the purge'll be on us," fretted Doc, and all the Dwarfs were very sorry about Snow White.

But after a while Prince Charming (who was as much of a favorite with Snow White as he was a pain in the neck to the Queen of the Fourth Estate) came along on the White Donkey and somehow managed to rescue Snow White, although she was pretty shaky after that congressional investigation.

And so it was that when the Queen once more banged on the mirror, the old guy came up with a puzzled look on his face.

"Well, I dunno, Queenie," said the fellow who did it all with mirrors, "Snow White has her points. She flies through the air with the greatest of ease, and she can make more friends and influence more people. But you're a tough old gal and full of spunk. I guess we—that is, the Board—like you both equally well. Why not bury the hatchet? You're both free—so far, at least. There's plenty of room in the Land of Com-

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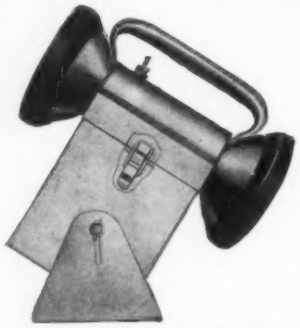

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munications for both of you cats; why don't you live and let live?"

"Maybe you're right," said the Queen, "especially since that particular cat seems to have more lives than I can kill."

And so our story should end here with Snow White and the Queen living happily ever after. But unfortunately this is not altogether a fairy tale. The latest dirt, from very responsible authority, is that Snow White is expecting a little bundle from heaven by the name of Television.

It is due any day now—and both the cats are jealous again. In short, Snow White and the Queen are pretty nearly nuts trying to figure out whether the new arrival will put them both on the shelf. The Seven Dwarfs are all upset about it. And even the telephone and moving-picture barons of the Land of Communications are wondering how it is all going to come out.

ODDS AND ENDS: When asked if he should vote for the forthcoming Holt resolution against another term for the President, Senator Vandenberg of Michigan assented vigorously, adding that he only wished there were some way of "making it retroactive." . . . Astute Washington observers are wondering if Harry Hopkins left Santa Claus holding the bag, or vice versa. . . .

Washington doctors are so unstrung over the government's antitrust prosecution against the medical association that one prominent nose and throat specialist is reported to have actually grabbed up his wife's new slice-of-pineapple hat and tried to examine a patient's tonsils through it.

▼ ▼

Refunds to Subscribers in West Virginia

The mailing of checks began in early December refunding to certain subscribers of the Chesapeake & Potomac Telephone Co. of West Virginia the increased rate, paid over a period of seven years, which the West Virginia Utilities Commission has refused to authorize. It was said the checks would be issued alphabetically by towns. The increased rate was collected by the company from 1925 to 1931, inclusive, according to news dispatches.

Persons on one-party and two-party lines under terms of the settlement will get $7.99 with interest up to the time of settlement, while four-party-line folks will get $16.01 and the same rate of interest.

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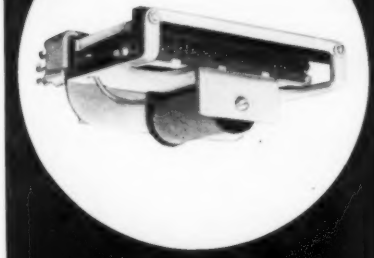

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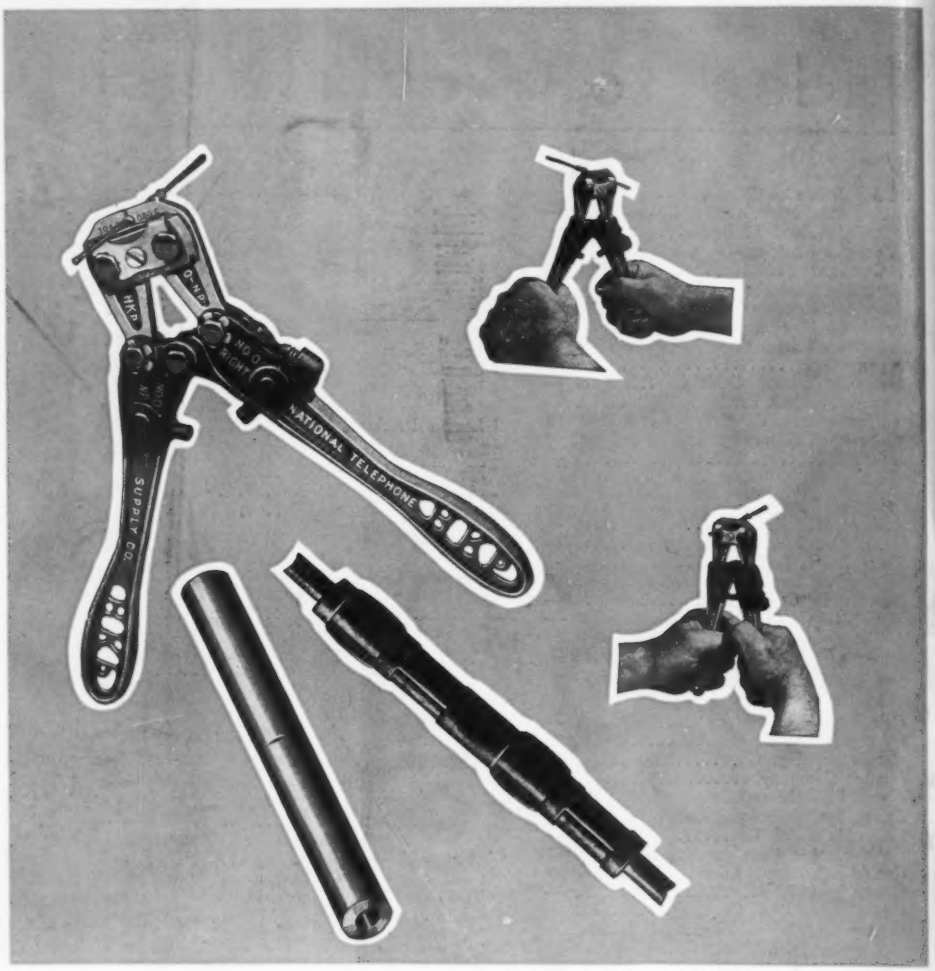

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